NOVEMBER, 1955

WOOD WORKING Digest

A HITCHCOCK PUBLICATION

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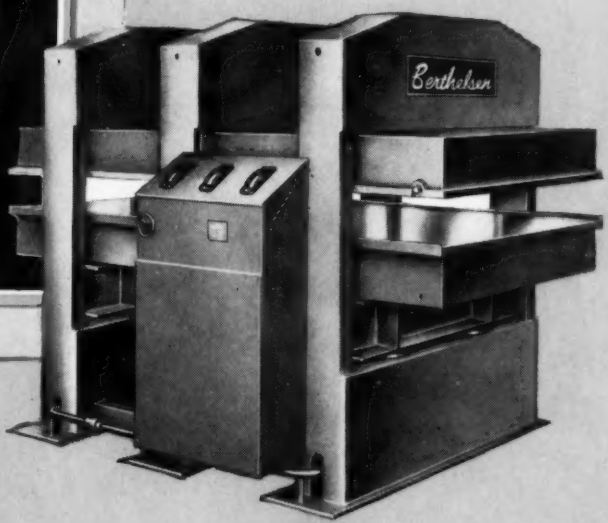
another reason why **BERTHELSEN PRESSES** *are better...*

pre-set controlled

UNIFORM PRESSURE

An important factor in the control of quality is the maintenance of uniform pressure over the entire platen area throughout the pressing cycle. BERTHELSEN ENGINEERS have designed the BERTHELSEN PRESS for direct adjustment of working pressure by pre-setting the indicator on the pressure gauge. Once set the pressure is automatically maintained during the curing cycle until the automatic opening of the press.

This controlled uniform pressure is only one of many Berthelsen Hot Press features that contribute to your quality control. Investigate how BERTHELSEN PRESSES used with modern production methods pay for themselves.



Write today...

Free folder on request.

BERTHELSEN PRESSES

P. O. BOX 1423 • LOCKPORT ROAD • JOLIET, ILLINOIS

OLIVER Band Resaw & Scroll Saw saves money two ways

• For smooth and rapid scroll work

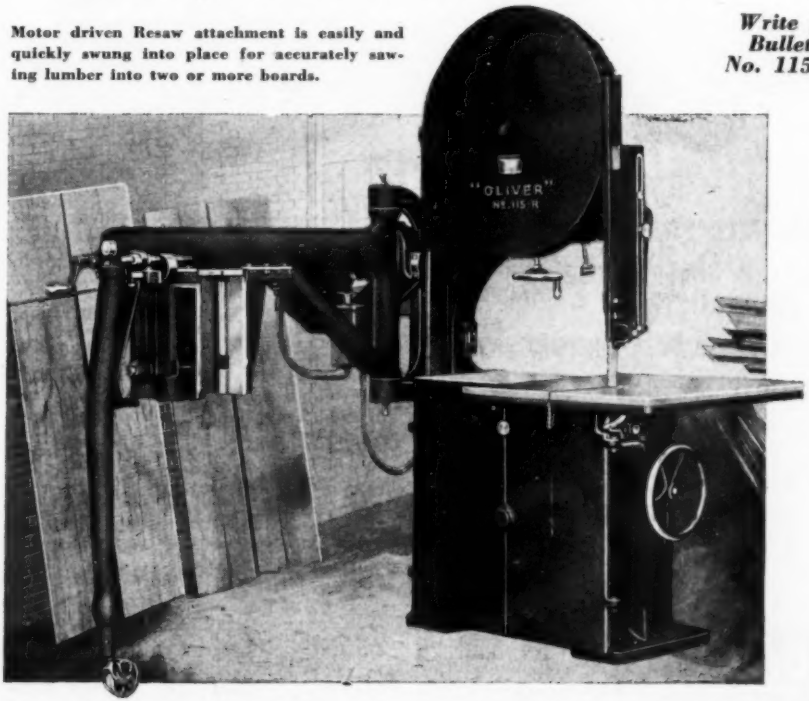
This Oliver 38-inch Band Saw is the finest built. It takes 20 inches under guide, 38 inches between saw and column. Has ball bearing aluminum ring-disk wheels—lightweight, rigid. Large table tilts 45° to right, 5° to left; self-locking device registers angle of tilt. Quickly and easily adjusted.

• Cuts two or more boards out of one

The Resaw attachment saws lumber into boards of desired thickness. This method saves time and valuable lumber over the common method of planing a board, half the lumber being converted into shavings. Stock is motor driven at the rate of 10 to 20 feet a minute. Takes stock up to 16 inches high, 8 inches thick.

Motor driven Resaw attachment is easily and quickly swung into place for accurately sawing lumber into two or more boards.

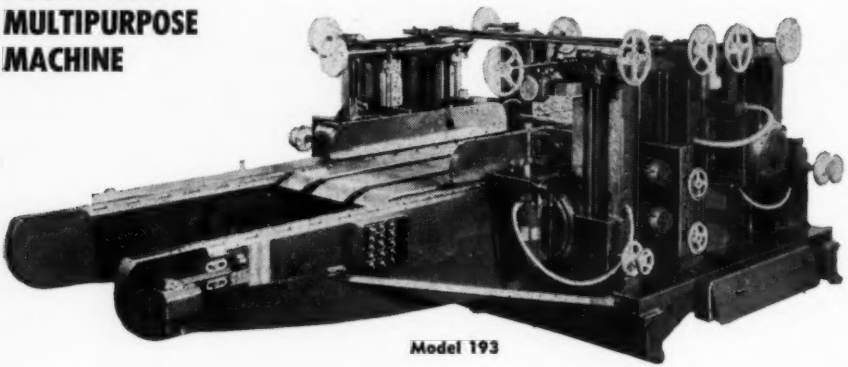
Write for Bulletin No. 115-RD



OLIVER MACHINERY CO. **Grand Rapids 2, Michigan**

ANOTHER Jenkins FIRST

THE 190 SERIES CONTINUOUS FEED— DOUBLE END MULTIPURPOSE MACHINE



Model 193

NEW FEED SHAFT POSITION

DUAL & SINGLE BASE CONSTRUCTION

EXTRA HEAVY CONSTRUCTION

INFINITE SPEED VARIATIONS

- **A.** 180° tilting Trim Saws cut above or below chain.
- **B.** 180° tilting Copes inside Feed unit.
- **C.** Dado top and bottom or both.
- **D.** 90° tilting Tenon and Scoring Assembly if desired.

Your Choice of:

THREE STAND—5 STATION MACHINE (193)

For complex operations in one pass. Multiple Double End Edging, Double Surface Grooving, Dadoing, Texturing, and many other high speed operations.

Equip with **ANY** combination of Trim Saws, Scoring Saws, Tenon Heads, Upper, Lower, or both Stationary or Jump Dado. Stands for additional cutting equipment available.

TWO STAND—THREE STATION MACHINE (192)

Trim-Tenon-Cope-Dado if desired. Any combination of cutting equipment.

TWO STAND—THREE STATION MACHINE (192B)

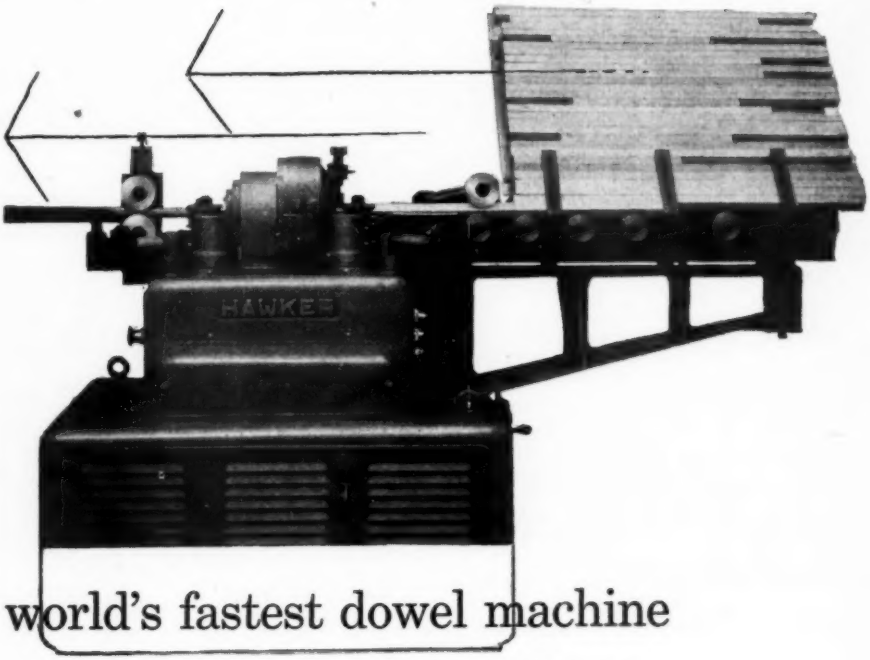
Equipped with Trim Saws, Two stations open for any cutting operations desired.

SINGLE STAND—SINGLE STATION MACHINE (191)

Equipped with Trim Saws for LOW COST SIZING AND EQUALIZING.

IDEAL FOR SLAT BED or MULTIPLE CHAIN OPERATIONS.

Jenkins WOODWORKING MACHINERY DIVISION
Curt G. Joa, Inc.
SHEBOYGAN FALLS, WISCONSIN, U.S.A.



world's fastest dowel machine

now world's easiest!

Now—one man can easily keep the machine—the Hawker rod and dowel machine, the world's fastest—running at capacity, all day long. A number of installations are proving this every day.

The new semi-automatic feeder (operator merely fills rack with rough stock as needed) makes possible even more profitable use of this machine. And it rounds out these standard features:

Minimum of vibration and chatter, no splintering—self-centering stock guide holds stock to within ½" of cutters.

No twisting or spinning of dowel—vertically mounted secondary outfeed rolls prevent it.

Higher cutting speeds, better surface finish—variable speed stock-feed drive lets operator select speed best suited for size and stock.

Write for new Hawker manual. The Hawker Manufacturing Co., 1449 Keowee Street, Dayton 4, Ohio.

PRODUCTION MACHINES FOR WOOD: DOWEL, CHUCKING, SPECIAL

HAWKER

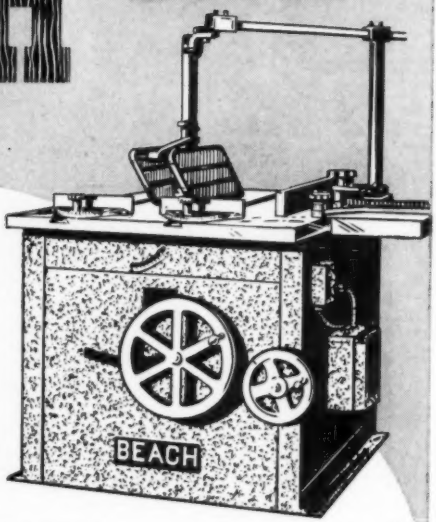
SPECIFY

BEACH

tilting arbor

SAW

- for ripping
- cut-off
- dadoing



Beach Tilting Arbor Variety Saws are available in 4 styles for dependable, high precision cutting.

Model 800—with rolling table, 27" travel
Model 801—with 4', 6' or 8' extension on one side
Model 802—with 4', 6' or 8' extension on both sides
Model 805—with stationary iron top

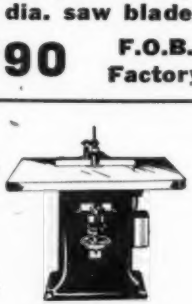
- Vibration-free frame gives smoother performance; greater accuracy on heaviest work
- 48" x 80" table size with standard cut-off gauge, mitre gauge and bevel ripping gauge
- Built-in 5 H.P. ball-bearing, 2 or 3 phase motor
- Tilting mechanism insures perfect alignment
- Built-in steel dust collector
- Adjustable saw guard and splitter

Capacity to carry 20" dia. saw blades

$790 F.O.B. Factory

WRITE TODAY for complete information and specifications on the Beach Tilting Arbor Variety Saws!

DOUBLE CUT-OFF SAW



SHAPER

TILTING TABLE SAW

BEACH
MANUFACTURING CO.
MONTROSE, PA.

November, 1955
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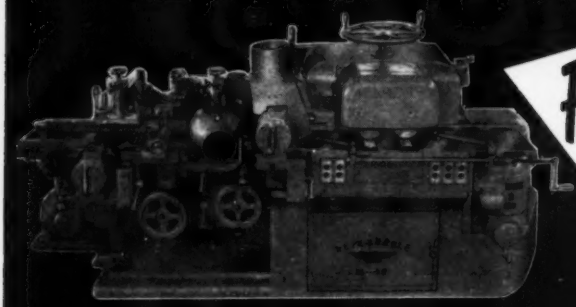
MAKE PATTERN CHANGES



FASTER WITH A

DEPENDABLE MOULDER

Don't waste time with change-over on patterns . . . cut change-over time to a minimum with a Dependable Electro-Unit Drive moulder.

Thanks to Dependable's versatile Cartridge Spindle Unit, your moulder is never "down" with cutter grinding and jointing. Complete spindle is removed with head intact. No tools are required.

Moulder production is easily pre-planned. As one pattern is being run, another pattern can be made ready for the next run. Down-time is cut in half.

With a Dependable Moulder, higher speed production is assured. Rate of feed is from 20 - 150 FPM with U. S. Varidrive. Variable high spindle speeds (up to 6,000 RPM) are obtained **without frequency changer,** giving you finer finishes with fewer knives. Higher spindle speeds save you time and money because **four knives do the work of six.**

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NEW BULLETIN C-12

Dependable

MACHINE COMPANY, INC.

GREENSBORO, NORTH CAROLINA, U. S. A.

"Our SKIL Saw Has A Service-Free Record

After More Than 10 Years of Hard, Steady Use!"

Says Mr. George Fennema,
Oakley Manufacturing Co.
Chicago, Illinois

"Except for changing the brushes, we have never once serviced our SKIL Saw," says Mr. Fennema, owner of a Chicago wood-working plant. "The SKIL Model 77 handles almost every cutting job in our shop—even tricky cutouts. It balances easily for any position or cut. It is fast, and saves almost half the production time required with a stationary saw."

Thousands of SKIL Saw owners agree that SKIL is unequalled for dependability, speed, and economy. Try SKIL yourself!

LONG LIFE! **All Ball-Bearing.**
VERSATILE! **Foot Design Permits Right or Left Cuts.**
CONTROL! **In-Line Rear Handle.**
ACCURATE! **Blade Visible at Cut.**

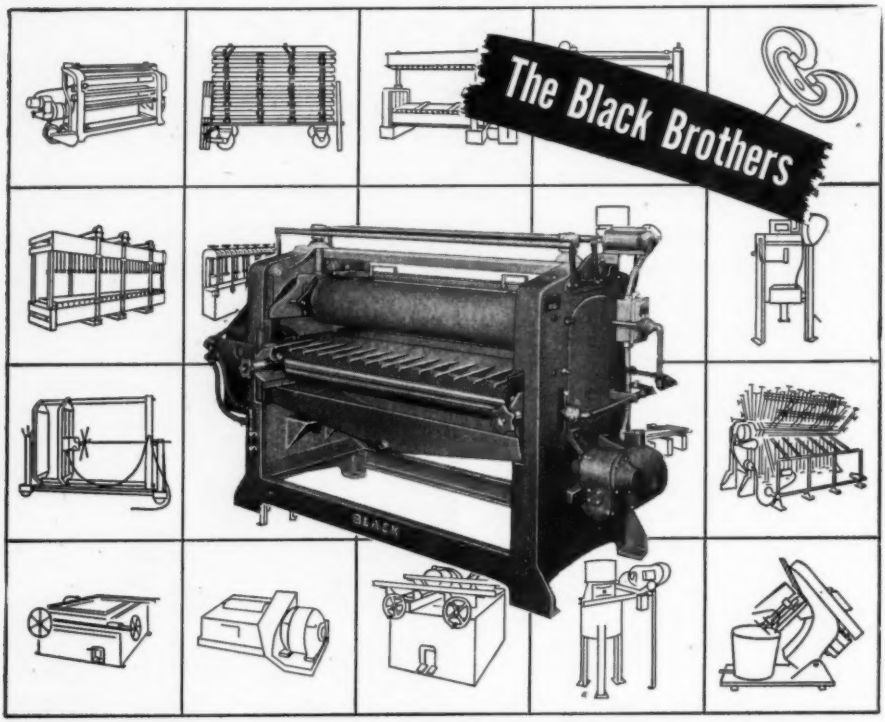
TWO SUPER-DUTY MODELS

MODEL NO.	77	825
Blade Diameter	7¼"	8¼"
Maximum depth of cut	2⅜"	2⅝"
Depth cut at 45°	1⅞"	2⅛"
No-Load speed	4500 r.p.m.	4000 r.p.m.
Net weight	15½ lbs.	16½ lbs.

SKIL PORTABLE TOOLS

Made only by SKIL Corporation
formerly SKILSAW, Inc.
5033 Elston Avenue, Chicago 30, Ill.
3601 Dundas Street West, Toronto 9, Ontario
Factory Branches in ALL Leading Cities

CALL YOUR NEAREST SKIL DISTRIBUTOR OR WRITE FOR INFORMATION



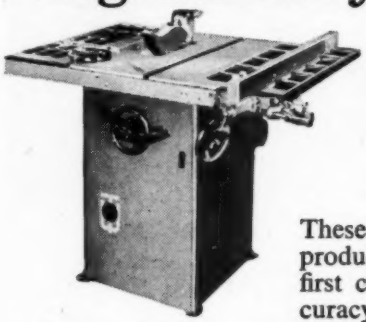
A Complete Line of Laminating & Gluing Equipment

Black Brothers manufacture a complete line of laminating and gluing equipment of nationally recognized superiority. Illustrated above is a No. 22-D resilient roll, ball bearing glue spreader equipped with water cooled doctor rolls as an optional extra for use with quick setting glues. Gluing rolls are deeply covered with fine synthetic rubber, and are specially grooved to control the amount of resins deposited and to conform to irregularities in the veneer. Accurate, heavy duty ball bearings are sealed to keep lubricants in, and dirt and glue out. Black's 22-D Spreader for resins, casein, and other cold glues is unmatched in speed, economy, accuracy, cleanliness and quality production. Write for details today . . . or let us send you a catalog on the complete Black line.

"If It Is Gluing Equipment - We Have It"

THE BLACK BROTHERS CO., INC.
MENDOTA, ILLINOIS, U. S. A.

These **NEW** Walker-Turner "Light-Heavyweights" give you



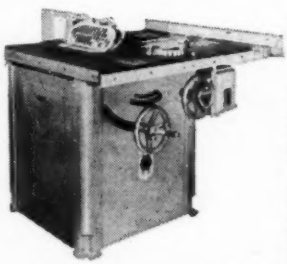
BIG MACHINE PERFORMANCE at LOWER COST

These rugged new saws slice right through your production costs . . . start earning their way the first cut you make. Here's performance and accuracy you'd normally find only in much heavier, more expensive machines.

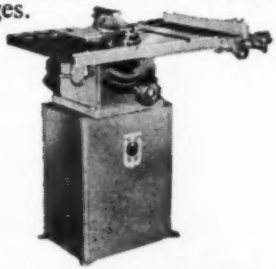
Faster, smoother production cutting is built right into these new Walker-Turners! Motor mounting and arbor *tilt as a unit*. Guard and splitter are always lined up with the blade for protection at any angle. Saw arbors mounted on precision ball bearings on all models.

Ask your Walker-Turner Distributor for complete specification sheet, and a demonstration of what these new saws will do for *you*. He's there to help you. You'll find him listed under "Tools" in your phone book's Yellow Pages.

No. 2221 — 10" Tilting Arbor Saw — Capacity: 3⅛" with 10" blade; 2⅛" at 45°; with 6" dado, 1⅛". Speed: 3800 rpm. Table: 32½" deep x 32" wide; 32½" x 45¾" with extensions. With 10" combination blade, extension tables, miter gauge, guard, splitter, motor pulley and belt (without motor) $297.00.



No. 2450 — 14" Tilting Arbor Saw — Capacity: 5" with 14" blade, 3½" at 45°; with 8" dado, 2". Speed: 3450 rpm. Table: 38¾" deep x 48" wide with extension. With 14" combination blade, extension table, miter gauge, splitter, guard, including 5 hp 220/440 volt 60 cycle 3-phase motor, with push button station. $946.50.



No. 2121 — 8" Tilting Arbor Saw — Capacity: 2⅝" with 8" blade, 1½" at 45°; with 6" dado, 1⅝". Spindle speed: 4000 rpm. Table: 23" deep, 19" wide; 23" x 37" with extensions. With 8" blade, extension tables, miter gauge, guard, splitter, belt, motor pulley and sub base (without motor) $192.00.

walker-Turner

WALKER-TURNER

• DIVISION •

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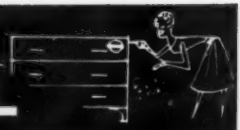
PLAINFIELD, N. J.

DRILL PRESSES — Hand and Power Feed • RADIAL DRILLS
Wood and Metal Cutting BAND SAWS • TILTING ARBOR SAWS
RADIAL SAWS • JIG SAWS • LATHES • SPINDLE SHAPERS • JOINTERS
BELT AND DISC SURFACERS • FLEXIBLE-SHAFT MACHINES

THIS SEAL WILL HELP YOU MAKE MORE SALES



FINE HARDWOODS ASSOCIATION
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American Grafted
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Millions of homemakers are looking for it, before they buy. It's the nationally advertised hallmark of fashion, quality and value . . . now available for use on all furniture, TV cabinets and other hardwood products made of *real* hardwoods. Seal not permitted on products made with imitation wood surfaces.

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IT WILL HELP YOUR DEALERS SELL YOUR PRODUCTS. *Trade ads, booklets and sales training film "The Story of Fine Hardwoods" are telling furniture and TV retailers coast-to-coast to feature this seal as a point-of-purchase selling aid.*

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WWD 1155

Please send us full details and application for use of "Genuine Hardwoods" seal on our products. No obligation.

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BY_____

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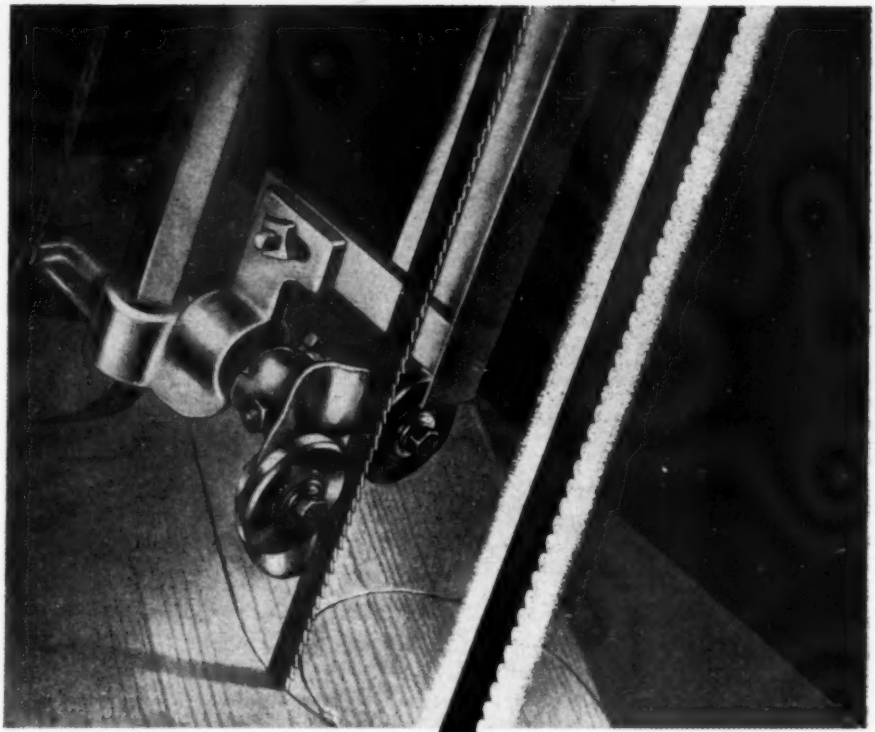
CITY_____ STATE_____



Two Types of SIMONDS Narrow-Band SAWS

Which one should you use?

FILING TYPE— If you've got sharpening facilities, this may be the blade for you. Made of Simonds own special steel, they're unusually tough. A generous hook in the teeth makes cutting fast and easy. Round gullets and well-rounded saw backs prevent cracking. Burr-free teeth are filed extra-sharp . . . given a precision set. Tops in every respect, they're the finest, longest lasting blade of their type.

DISPOSABLE TYPE— Made of tough, alloy steel with only the tooth edge hardened. Simonds new Sabre Tooth Saw (or standard Skip-Tooth) provides extra gullet capacity and permits faster cutting. Flame hardened tooth edge provides many times more cutting life. Saves on blade replacement and sharpening costs — blade is merely thrown away when edge finally goes.

Both type blades are made in all standard widths, thicknesses and tooth sizes, in coils or welded-to-length. Now stocked by your Industrial Supply Distributor.

SIMONDS SAW AND STEEL CO. FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon, Canadian Factory in Montreal, Que., Simonds Division: Simonds Steel Mill, Lockport, N. Y. Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

For Fast Service from Complete Stocks

Call your SIMONDS Industrial Supply DISTRIBUTOR

ECCO

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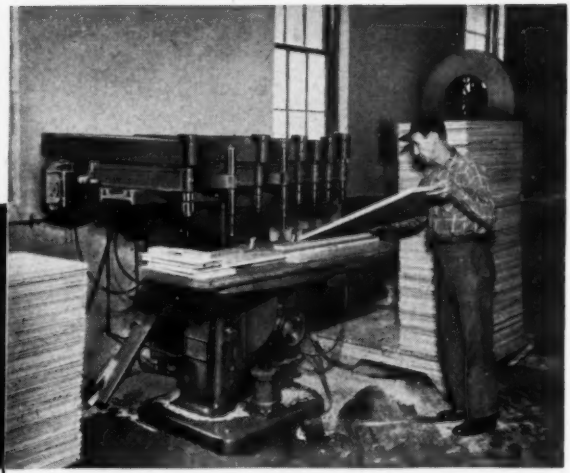
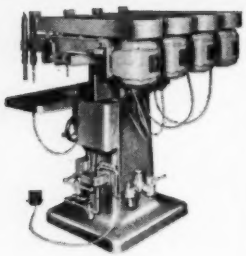
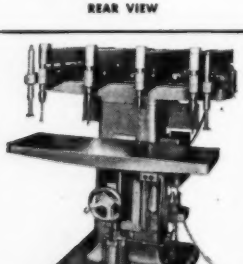




REAR VIEW



FRONT VIEW

EKSTROM, CARLSON MULTIPLE-SPINDLE

BORER

The big advantages of this machine are: Versatility, Easy Adjustment, Rigidity, Accuracy, High Production Efficiency, and Automatic Table Feed Cycle. Standard machine has four spindles and two spring hold-downs, each positionable forward, backward, or sideways as desired on two T-slot rails. Individual belted motor drive on each spindle can be turned on or left idle independently as needed. Machine can be set up for single or series operations, as shown in picture above. Also available with more spindles, two-spindle cluster heads, larger tables, longer mounting rails. Spindles in sleeve-bearing cluster heads can be furnished with as close as 5/8" center-to-center distance, while 1-1/8" is the minimum using ball bearings. Write for quotation, or see your ECCo representative.

CONDENSED SPECIFICATIONS

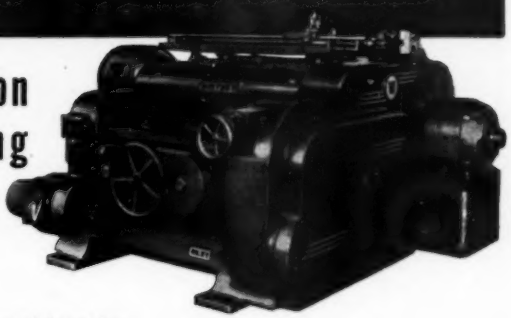
Spindle Motor Horsepower	1
Spindle RPM	3600
Work Table Size	16" x 48"
Minimum Center Distance between Spindles	2-1/2"
Spindle Chuck Capacity	0" to 1/2"
Maximum Clearance between Table and Chuck	10"
Adjustment of Spindle Arms (Front to Back)	14-3/8"
Vertical Knee Adjustment	6"
Maximum Table Stroke	4"
Adjustable Table Dwell (Loading Position)	3/10 to 60 seconds

EKSTROM, CARLSON & COMPANY
1411 RAILROAD AVENUE, ROCKFORD, ILLINOIS

ECCO

WHITNEY 97
DOUBLE SURFACER

For quality production and low cost planing



Whitney 97 Double Surfacer
Feeds. 30 to 90 feet per minute
Planes stock ⅛" to 7" thick
Widths, 30" 36" 40" and 44"

The Whitney 97 Double Surfacer, the last word in modern planer design, is built to handle your double surfacing requirements. Its rugged proportions and faster feeds permit it to handle easily the volume production required in today's modern plant. Traditional Whitney accuracy and careful workmanship assure smooth, accurate planing, continuous production, low cost maintenance and the stamina to produce best results under the severest kind of service.

The Whitney 97 will bring to your plant a new conception of production efficiency and cost savings. High production quotas will be maintained and sanding and finishing costs substantially reduced. Investigate today the Whitney 97 for your double surfacing requirements. Write for full particulars. Ask for planer bulletin **D 1.**

Check these features

- **Wedge Construction**
- **Nitralloy Center Table**
- **Ball and Roller Bearings thruout**
- **Motor Raising and Lowering of Bed**
- **Built-in Variable Speed Feed**
- **Micro-feed Selector**
- **Automatic Power Feed Grinder**

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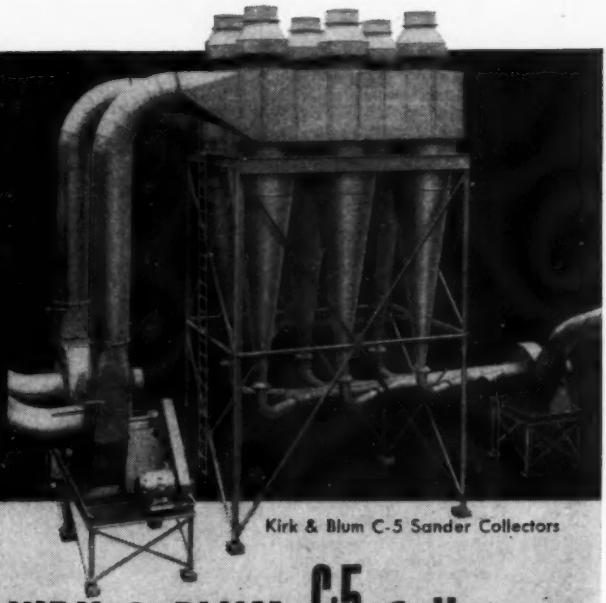
Baxter D. Whitney & Son, Inc.
WINCHENDON, MASSACHUSETTS, U. S. A.
Quality Built Woodworking Machinery Since 1837

Planer Specialists
FOR MORE THAN 100 YEARS

PLANERS • SHAPERS • AUTOMATICS • VARIETY SAWS • BACK KNIFE LATHES

SANDING DUST A PROBLEM?



Kirk & Blum C-5 Sander Collectors

NOT with KIRK & BLUM C-5 Collectors

Dust Free Sanding Room

Kirk & Blum C-3 Bin Collector

In the new sanding room of the United Furniture Company, Lexington, North Carolina, cleanliness results where KIRK & BLUM puts "Clean Air, The Invisible Tool" to work. Outside too, the battery of high efficiency KIRK & BLUM C-5 Collectors, handling sander dust exclusively, prevent a dust nuisance.

KIRK & BLUM provides completely integrated dust control systems, from design through fabrication and installation. Why don't you consult KIRK & BLUM regarding your dust control problem?

KIRK & BLUM
Dust Control Systems

The KIRK & BLUM Manufacturing Co.
3121 Forrer Street Cincinnati 9, Ohio

ARE YOU EQUIPPED
TO MEET THE DEMANDS
FOR BLINDS, JALOUSIES
AND LOUVERED DOORS?

Stiles Mortised or Bored Faster with the

Ideal for wood frame jalousie production

FAY & EGAN

BLIND STILE MORTISER AND BORER

For jalousies, rolling blinds, indoor or outdoor slatted blinds, let the FAY & EGAN Automatic Blind Stile Mortiser and Borer put production on a more profitable basis.

It's fully automatic . . . the operator merely loads a pair of stiles and engages a lever. It bores 90 pairs of holes or blind mortises at a high rate of speed. Smallest stock handled is ⅝" x 5⅝"; largest, 2" wide by 6" high. Mortise ranges from round hole to 2¼" in length and up to ⅝" deep . . . at any angle up to 45°. Machines can be arranged right and left handled to operate in pairs, thus doubling production.

Eliminate make-shift jigs and wasted time. Reduce setup and changeover time. The FAY & EGAN Mortiser and Borer puts blind stile production on an automatic basis, saving time and money. Write for further details or sample of stile made on a FAY & EGAN Machine.

FAY & EGAN 2023 EASTERN AVENUE CINCINNATI 2, OHIO

World's Oldest Manufacturers of Woodworking Machinery

How *Borden-bonded* CUTS COSTS,

For rigid structural panels, flooring underlay, sheathing and other building uses.

Wood products manufacturers and builders are finding this new wood waste board a sound way to effect construction economies and still maintain the quality on which their reputation rests.

Made of wood waste chips bonded together under heat and pressure with a special Borden adhesive, it is a structural board with unusual strength and rigidity. Warpage is no problem. It has exceptional nail-and-screw-holding power. And it can easily be veneered to meet the user's requirements.

Even now this economical new waste board is being widely used for the construction of furniture, doors, interior panels, flooring underlay, sheating. More widespread use is predicted as the result of experimental projects now under way . . . because this wood waste board can actually save up to 40% of the cost of regular lumber stock for which it is substituted.

At a time when your customers demand more value with no price increase, this conversion of wood waste chips to usable lumber stock is a particularly important development. It enables you to conserve wood by using slabs, cut-off ends—

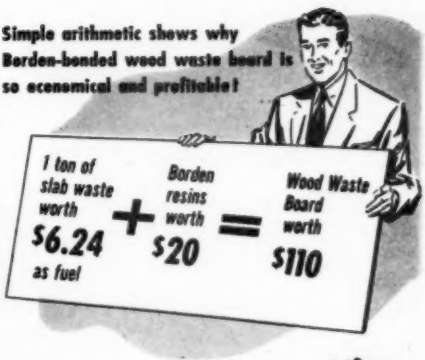
For furniture cores that are perfect for veneering.

wood waste board

BUILDS PROFITS!

even the tops, branches, brokes and culls of the tree—by grinding them into chips and bonding them with Borden resin to form waste board. It has been reported that while as little as 12% of a log is utilized when sawed . . . up to 67% can be used if it is made into wood waste board.

If you would like further information on where to locate wood waste board for use in your woodworking or building operation . . . or if you would like to know more about the production of this revolutionary new material . . . write us without obligation. The Borden Company, Chemical Division, Dept. WWP-115, 350 Madison Avenue, New York 17, N. Y.


Simple arithmetic shows why Borden-bonded wood waste board is so economical and profitable!
1 ton of slab waste worth $6.24 as fuel
+
Borden resins worth $20
=
Wood Waste Board worth $110

MAKE BORDEN YOUR HEADQUARTERS FOR ALL WOODWORKING ADHESIVES

For more than 50 years, Borden has specialized in developing adhesives for the woodworking industry. With our know-how, we can determine just the right catalyst to do your job best, under your operating conditions. So whether you make plywood, flush doors, furniture—or the revolutionary wood waste board—take advantage of Borden's longer experience and superior glues. Bring your adhesive problems to Borden for a quick, sound solution.

INDUSTRIAL ADHESIVES

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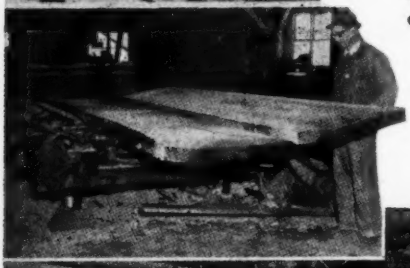
THE *Borden* COMPANY

CHEMICAL DIVISION



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DEPENDABILITY
ASSURES *Your* PROFITS
the wood you want, when you want it, in the quantities you want, through your Atlantic Man.

RESOURCES for YOU....

In our Smoky Mountain Timber tract see the beautiful Yellow Poplar ready to be felled. It is timber such as this that produces lumber of superior quality, as, for example, the thick Poplar pictured below at our Erwin, Tennessee, mill.

This panorama of activity is a view of our Knoxville, Tennessee plant, a busy place where excellent Appalacian hardwood lumber is produced.

It's a fascinating and dramatic story of men and machines geared to your every Hardwood need. Ask your Atlantic Man. Watch for other scenes here and in your Atlantic Log published monthly.

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THE HALLMARK

of Quality

Represented in the Entire Knife Line. And Introducing a New High Speed Steel Thin Knife

Stalter EDGE TOOL CO.

THIN HIGH SPEED STEEL

SHAPER STEEL

TUNGSTEN TEMPER

An entirely new and improved High Speed Steel Thin Knife is now being presented by the Stalter Edge Tool Company under the well known name of Tungsten Temper.
To provide a better knife Stalter has added an exclusive new NON-SLIP back. Metallurgical study has increased the edge strength. Order a set of Stalter Thin Knives and prove the advantages in your own plant.
The same new developments are incorporated in the Stalter Shaper Steel. The apex in shaper steel manufacture.

TUNGSTEN TEMPER

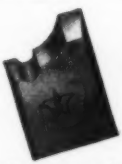
For use on modern fast moulders and stickers the Stalter Tungsten Temper (High Speed) or Thermo Temper (Carbon) provides the finest in slotted thick knives.

THERMO TEMPER

High Speed or Carbon Steel Planer Knives can be furnished to your specifications. Stalter Planer Knives can be supplied solid or inlaid. Write our engineering department for their recommendations.

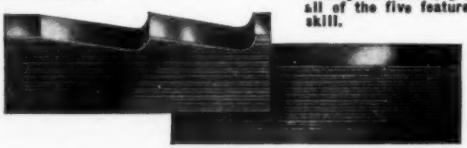
Accurate interpretation of your patterns, ground into one of the selected Stalter Knives, provides you with trouble free operation. Send Stalter your pattern or sample.

Tenon Knives furnished in High Speed or Carbon Steel, when made by Stalter, are the tops in durability, balance, and stamina.



Shaper knives made from Stalters premium shaper steel insures long lasting edges and safe operation.

Corrugated knives, ground-to-pattern, straight or bar length includes all of the five features of the Stalter knife making reputation and skill.



Stalter EDGE TOOL CO.

GRAND RAPIDS, MICH.

Quality wood parts by Morgan Manufacturing Co., Inc. BLACK MOUNTAIN, N.C.

We are quite particular what we pick up. But if our specialized machinery meets your needs, you'll be as delighted as will we. And we're not afraid of hard jobs!

Morgan Manufacturing Co., Inc. BLACK MOUNTAIN, N.C.

The Nation's largest producer of ready-to-assemble wood parts for furniture manufacturers

...and that goes for mahogany also!

MOST PROFITABLE WAY TO DISPOSE OF WASTE WOOD

WILLIAMS "No-Nife" HOGS

MAKE UNIFORM CHIPS FOR CHIP BOARD. Williams Hogs operated in closed circuit with Williams Vibrating Screens reduce wood offal to exactly the proper size chips for chip board, wall board or other profitable by-products.

CONVERT WOOD REFUSE INTO VALUABLE FUEL. Refuse, not otherwise usable is cheaply hogged for more complete combustion. Unhogged wood restricts air flow, smothers the fire, burns unevenly, creates excessive smoke. Williams equipment also reduces handling costs as much as 75%. When hogged, one man can handle as much as three men can handle in long, cumbersome pieces.

WILLIAMS CAN SUPPLY COMPLETE EQUIPMENT for the conversion of wood offal into wood flour, insulation or any of the new and more profitable uses of wood.

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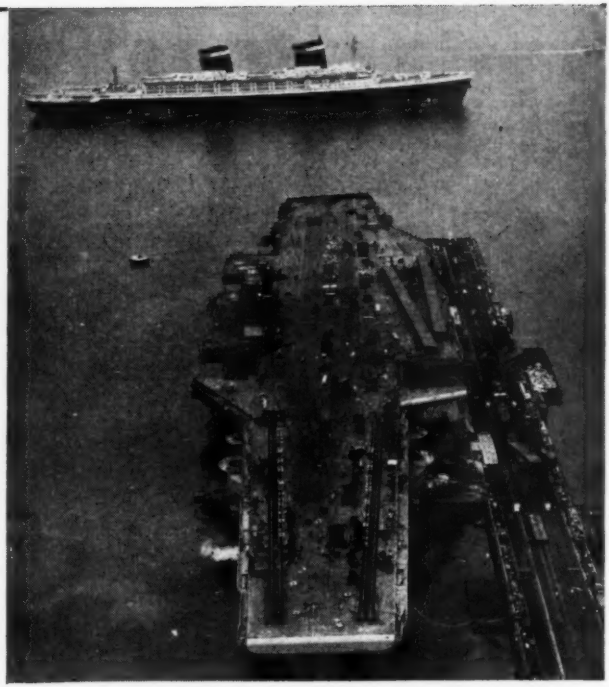
CRUSHERS GRINDERS SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD



ATOMIC-POWERED

With the *Queen Mary* in the background, the recently-launched *U.S.S. Enterprise* (atomic-powered aircraft carrier) is shown above under construction at the Newport News Shipbuilding & Dry Dock Company, Newport News, Va. The firm has three STANDARD PREFABRICATED DRY KILNS about which Mr. J. W. Irvine, Plant Engineer, writes: "I am happy to say that we are using our new prefabricated kilns and have found them very satisfactory. Our Mr. Cross reports a saving in time of operation more than half over the old brick and tile kilns which we formerly used!"

For additional information, write for your FREE Prefab Dry Kiln booklet!

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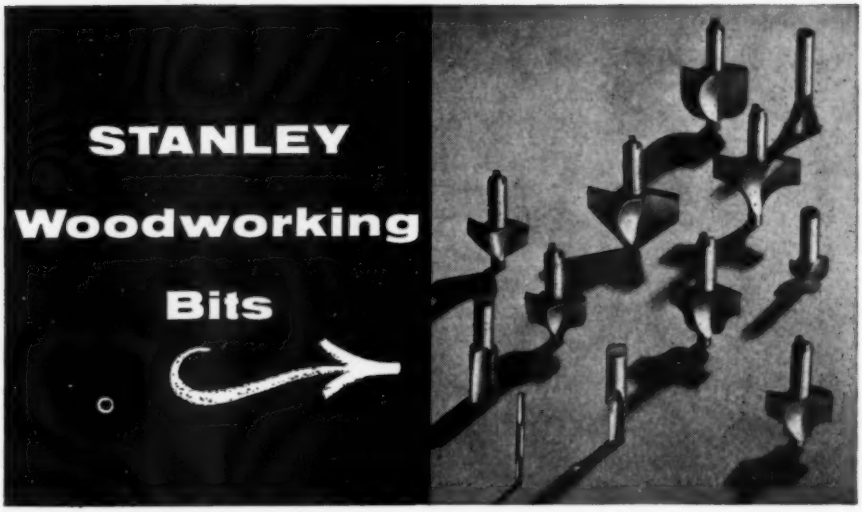

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Straight bits — A complete line in all sizes from 1/16" to 1" and in all lengths.

Single flute bits — From 1/16" to 3/8". Fastest cutting bit. Does not have as smooth a cut as spiral bit.

Two flute bits — From 1/4" to 1". Cuts somewhat slower than single flute and leaves smoother cut.

Spiral bits — Right and left hand spirals. Smoothest cutting . . . slower than single or two flute. Left hand spirals ideal for veneers, inlays — no fuzz on top of work. Cut 1½ times bit diameter in blind cut without burn.

Pilot bits — Include rounding over, beading, cove, chamfer, Roman ogee and rabbeting bits. No need for fence . . . cut on edges of compound curves.

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Tungsten carbide bits and specials in high speed steel and tungsten carbide available. See your industrial distributor. Write Stanley Electric Tools, 795 Myrtle St., New Britain, Conn. Ask for Catalog 79N

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A Division of The Stanley Works

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TWO NEW AUTO-NAILERS

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in 3-Nails-A-Second Automatic Nailing

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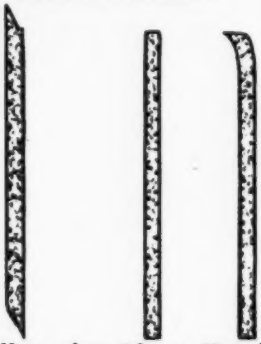
Featuring . . .

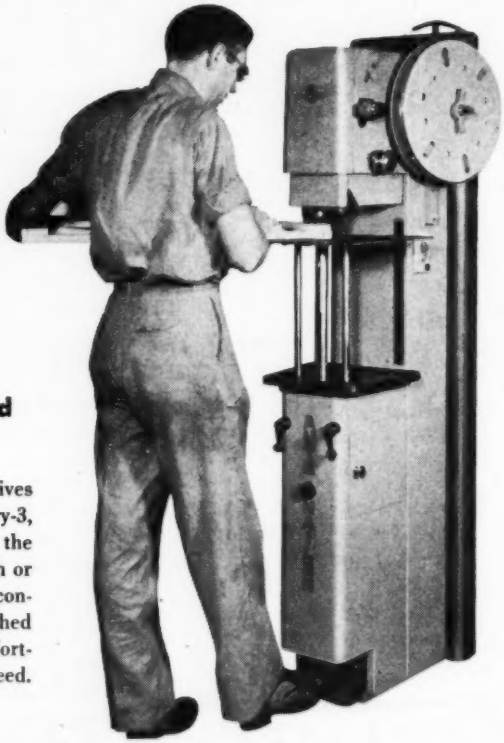
★ **Longer Nails** ★ **Faster, Easier Adjustments**

TROJAN-5 NAILS:



Needle-point Blunt Headed

The Trojan-5 Auto-Nailer cuts and drives nails up to 1¾" long and The Mercury-3, up to 1¼" long by a mere dial of the length desired. Heads are driven flush or countersunk by the twist of another convenient dial. And, nails can be clinched or bradded, as desired... All this—effortlessly...and with 3-Nails-A-Second Speed.



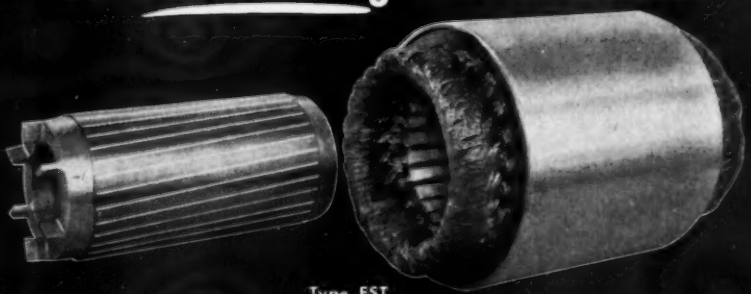
The Trojan-5 Model Auto-Nailer

Write for free catalog

AUTO-NAILER CO. 265 Marietta St., N.W. Atlanta, Ga.

QUALITY SERVICE
Imperial
RIGHT PRICES
COURTEOUS TREATMENT

SHELL TYPE SHAFTLESS MOTORS
of Outstanding Performance!



Type EST

Designed and Manufactured for the Ultimate in Dependability

of normal characteristics or for special applications requiring single or multi-speed or high-frequency operation, for high-torque, reversing or frequent starting service, or for quiet operation. Write Dept. 6

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THE IMPERIAL ELECTRIC COMPANY

GENERAL OFFICES: AKRON, OHIO

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MOTORS • MOTOR-ARBORS • FREQUENCY-CONVERTERS

More Work in Less Time

with ROCKWELL-built

DELTA 14" BAND SAW

DELTA QUALITY AT LOW COST

CAPACITY: Blade to Frame 13¾"; Under Guide 6¼" (12¼" with low cost attachment)

A precision built tool that makes fast, accurate cuts at minimum cost. Has 14" x 14" table, with milled slot. Table tilts 45° right, 10° left with positive stop at 90° to the blade. Widely spaced twin-trunnions give table absolute rigidity. Guides and ball bearing blade supports adjust independently with micrometer accuracy. Special sanding attachments available.

DELTA
ROCKWELL

DELTA QUALITY MAKES THE DIFFERENCE

In shop after shop, low-cost Delta 14" and 20" Band Saws are taking substantial bites out of wood cutting and finishing costs. Unequaled versatility lets you handle more operations—fine curve cutting, tapering, resawing, cut off and ripping—all faster, all to accurate measurement. You can even do edge finishing with inexpensive sanding belts. Delta quality construction permits high-speed multiple cutting and a reduction in unit cost. Delta accuracy assures quality work.

At Lower Cost Per Cut

DELTA Band Saws!

BIG CAPACITY — BIG VALUE

DELTA 20" BAND SAW

CAPACITY: Blade to Inside Column 19¾"; Under Top Guide 13⅜"; Under Wheel Frame 12⅛".

This big capacity production machine has a finish ground table 20⅜" wide by 24¼" long. A ⅜" x ¾" milled slot is provided for miter gauge. Table tilts 45° right, 12° left—locks at any angle with positive stop at 90°. Ball bearing blade guides assure precision, reduce blade breakage. Micrometer adjustment screws are within easy reach. For complete safety only the actual working surface of the blade is exposed.

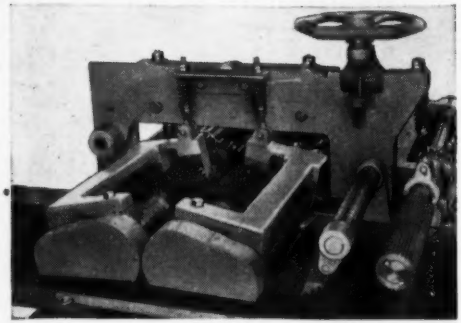
See for yourself how these rugged Delta 14" and 20" Band Saws and other low cost Delta wood and metal-working power tools can save you real money, and speed production in your shop. Get in touch with your Delta Dealer today—he's listed under "TOOLS" or "MACHINERY" in the classified section of your phone book. Or write Delta Power Tool Division, Rockwell Manufacturing Company, 666L N. Lexington Avenue, Pittsburgh 8, Pa.

DELTA QUALITY POWER TOOLS

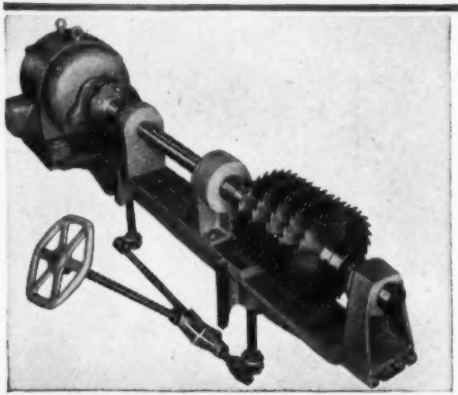
Another Product by **Rockwell**

Mereen-Johnson HEAVY-DUTY GANG RIP SAW

. . . even rips Glue Joints



Double spur roll short stock attachment, showing hand-wheel for unit vertical adjustment.



Heart of the No. 441 is the exclusive beam mounting of motor, arbor and bearings as a one-piece, rigid unit.

Power—Speed—Accuracy best describe the Mereen-Johnson No. 441 Gang Rip Saw. That it's in a heavy duty class by itself can best be demonstrated by the fact that *these machines are being operated with 125 HP on the arbor, making 22 cuts in 8-quarter gum at 100 F.P.M.*

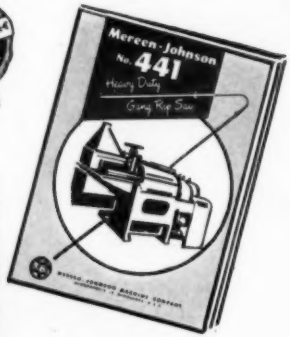
A combination of features make the No. 441 adaptable to a wide variety of gang ripping operations. For *wire-bound boxes* it will rip very short cleats at maximum production speeds while maintaining utmost accuracy . . . For *furniture core stock* and core banding strips, the No. 441 is used as a straight line gang rip saw . . . For *hardwood flooring*, the machine runs as a rough ripper ahead of the matcher, or it can be used as a smooth straight line ripper producing strip flooring . . . *Sheet materials* as insulation board, hardboard and plastic laminates are rapidly turned out when No. 441 machines with 19″ or 24″ arbors are used.

The one-piece arbor beam is an exclusive M-J feature. The table is stationary and the arbor is vertically ad-

motor, arbor and bearings as a one-piece, rigid unit.

machines with 19″ or 24″ arbors are used.

The one-piece arbor beam is an exclusive M-J feature. The table is stationary and the arbor is vertically adjustable. Arbor spacings offered include 12″, 19″ and 24″. Thicknesses can vary from ¼″ to 4″.



Send for the No. 441 Bulletin

8 pages of Fully Illustrated, Factual Rip Saw Data.

Mereen-Johnson MACHINE COMPANY

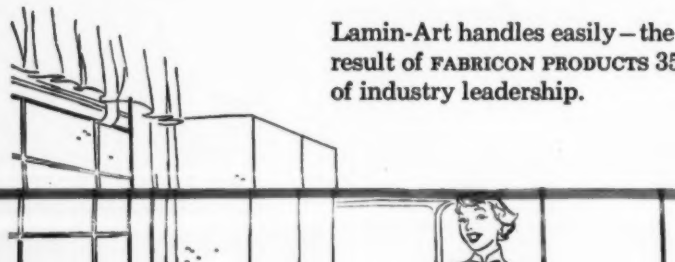
4401 LYNDALE AVENUE NORTH • MINNEAPOLIS 12, MINNESOTA

Lamin-Art

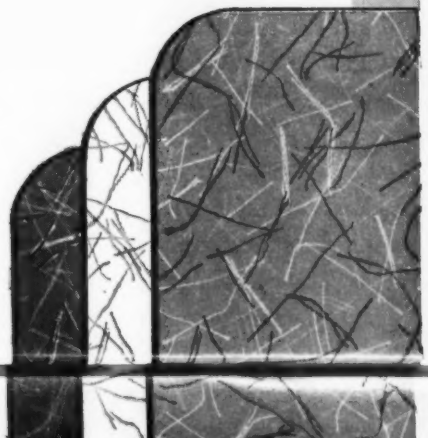
plastic surfacing GIVES YOU MORE*

Over 300,000 homes used Lamin-Art surfaces last year. The reason is found in Lamin-Art's reputation for saving time and money. This genuine high pressure plastic laminate is stocked for immediate availability in 24 sheet sizes in more than 60 patterns and colors. Because of its availability, Lamin-Art ends uncertainties of pattern or color substitutions and costly delivery delays. Lamin-Art actually cuts costs through its remarkable range of 24 sheet sizes. Ordering the economical sheet size eliminates expensive offal cuttings and excess waste trimmings.

Lamin-Art handles easily – the result of FABRICON PRODUCTS 35 years of industry leadership.



*24 Sheet Sizes stocked for immediate availability



Lamin-Art's brilliant new Catalina pattern in 8 superb colors

Lamin-Art

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Guaranteed by Good Housekeeping

NEMA

DISTRIBUTORSHIPS AVAILABLE IN SOME AREAS

MAIL THIS COUPON
to learn how Lamin-Art can give you More...

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FABRICON PRODUCTS
WHITTIER, CALIFORNIA

Please send literature on the Lamin-Art line.

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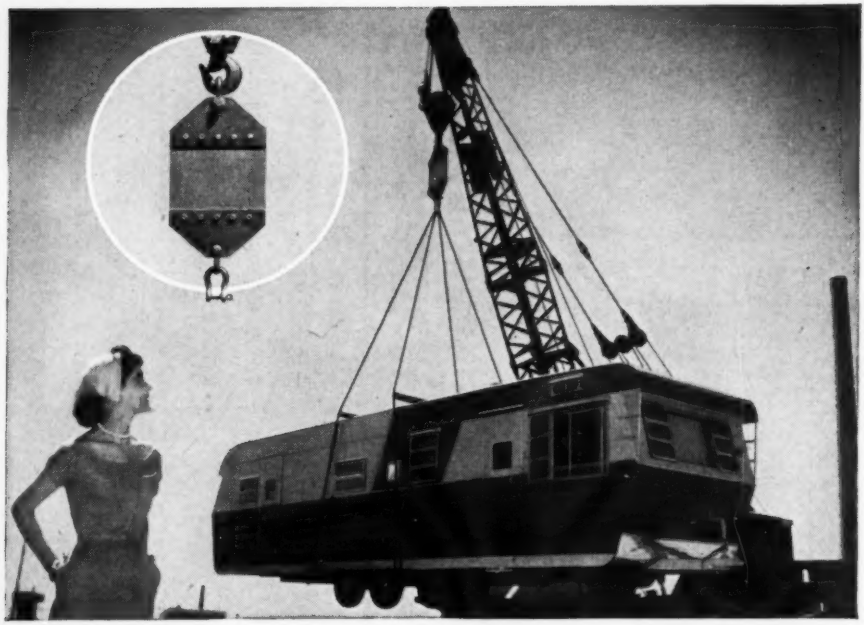


Presdwood stages 3½-ton holdup!

Talk about strength! When a Presdwood® panel only two feet square holds up a 3½-ton trailer for hours, then you know it's strong!

This dramatic demonstration only emphasizes the basic strength of these dense, grainless panels. For years they have been used in hundreds of products... where strength, uniformity and endurance really count. They fabricate easily with regular tools and they finish beautifully. There are 44 types, thicknesses and textures to choose from.

How can we help you? Write Masonite® Corporation, Dept. WWD-11, Box 777, Chicago 90, Ill.

Look for this man He makes the difference

MASONITE CORPORATION

MANUFACTURER OF PRESDWOOD PANEL PRODUCTS

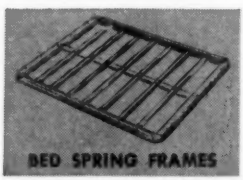
WHAT IS YOUR NAILING PROBLEM?

FMC HAS THE ANSWER

Many of the problems of industrial nailing which are troublesome to you today, may have already been successfully studied and solved by FMC nailing machine design and application engineers.

Problems arising from countless combinations of woods, materials, nailing patterns, speeds, space, manpower, pressures, feeds, mechanics, hydraulics and other variables have been resolved by our engineering department. From hundreds of case histories FMC can counsel with you on all phases of automatic nailing.

Hand us your nailing problem. We believe we can give you a successful FMC answer to it from the scores of types, sizes and models of FMC nailing machines which have been built and are in successful operation by firms like yourself—who once also had a nailing problem!



WRITE, giving us full details —or request Bulletin.

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Please send information on Nailing Machine Checked

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COMPANY_____

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AT THE JOHN WIDDICOMB CO. OF GRAND RAPIDS

Chairs and extension table are graceful and light in construction, yet built for lasting beauty. Dowel joints are permanently bonded with WOOD-LOK, National's cold run, ready-for-use resin glue.

Strength for Modern Simplicity comes from WOOD-LOK

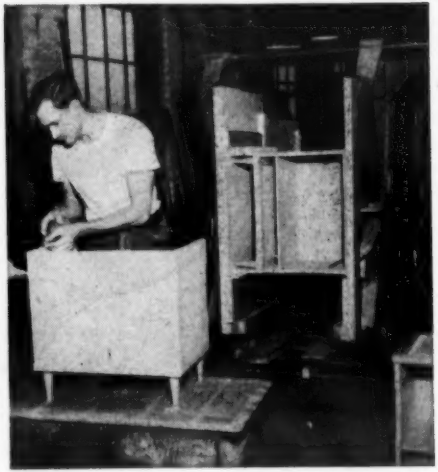
ready-for-use resin glue.

Strength for Modern Simplicity comes from WOOD-LOK

WOOD-LOK produces handling bonds in as little as 15 minutes. It is used for doweling, blocking and gluing, mortise and tenon.

WOOD-LOK prevents chilled joints by allowing 5-7 minutes open assembly time. Production is speeded by automatic air pressure case clamp.

WOOD-LOK simplifies gluing of doweled butts and all other joints. It stays fluid in National's one-pint squeeze-applicator for fast, uniform spreading.

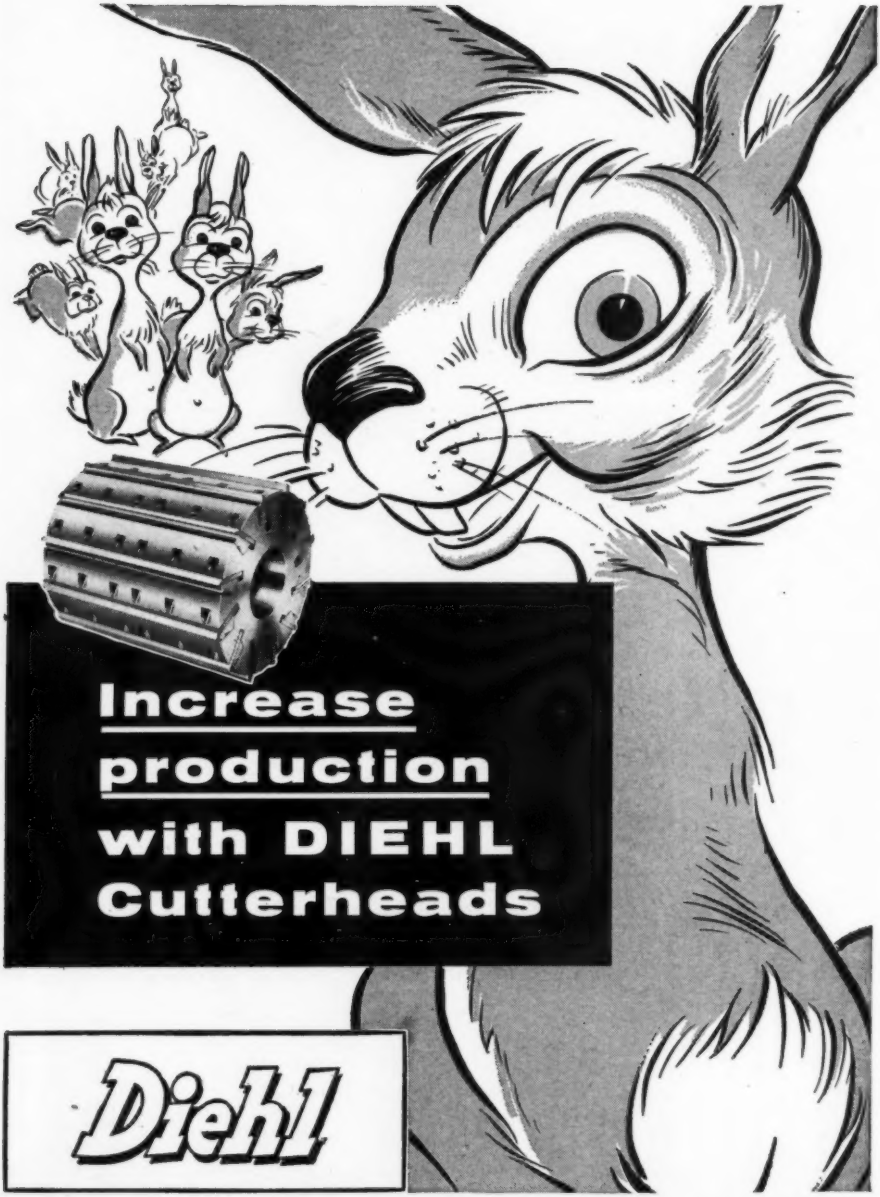


RESYNS®
National
ADHESIVES

WOOD-LOK vinyl co-polymer emulsion maintains maximum strength in dowel joints—as established by independent researchers.

SPECIAL OFFER! Write for 5 gallons of WOOD-LOK and a complimentary glue applicator—*on a trial and approval basis.*

NATIONAL ADHESIVES. Woodworking Department WD (Resin Division), 270 Madison Ave., New York 16 • 3641 So. Washtenaw Ave., Chicago 32 • 735 Battery St., San Francisco 11 • 1511-23 So. Main St., High Point, N. C.



THE G. M. DIEHL MACHINE WORKS, INC. • WABASH, INDIANA

The Editor's Page

"If you can't sell it, you can't make it." Regardless of product or location, these words are true for every manufacturer!

A Federal Government directory lists 1,350 different wood products. No doubt there are more things that could be made of wood. But, after all, the entire manufacturing picture is regulated by the statement: if you can't sell it, you can't make it.

Prices will rise this fall—that seems inevitable. Why not suggest to manufacturers that they add enough to their costs to cover some additional advertising? We believe that many associations should be using TV and consumer magazines to acquaint the public with the fine products the woodworking industry has to offer.

A recent telecast was most interesting. Purpose of the commercial was to show that plaster walls are far superior to any other type. The program consisted of a test and measurements of the results. The spot commercial was sponsored by an association.

We can think of at least a half dozen associations that could advantageously stress the fine qualities of wood or products made from wood in telecasts of this same type.

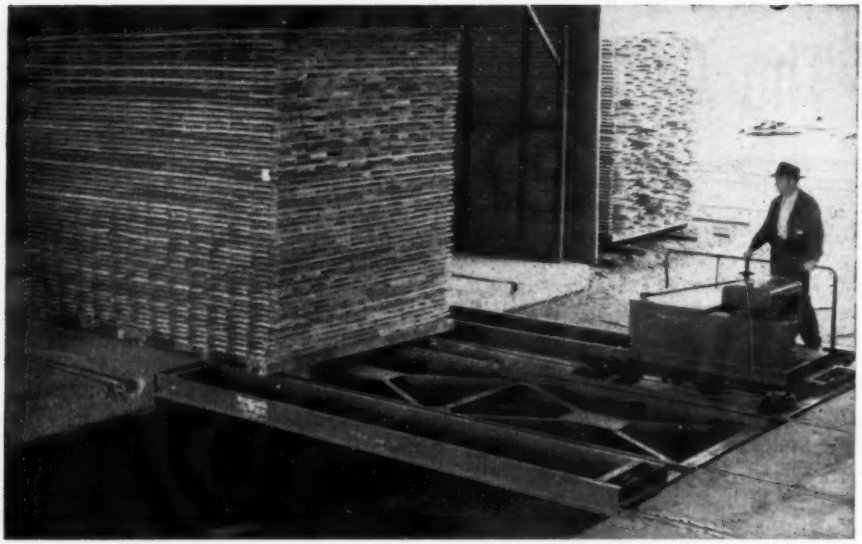
We believe in asking associations to do much of this job because we are then convincing the public on an impartial basis. This type of advertising would not benefit any particular furniture manufacturer, boat builder or fence maker, but would prove to the public that wood can do a wonderful job. The public becomes wood-conscious: a kind of awareness that benefits the entire industry.

Raise membership dues, but let's continue to tell the public just how good wood is. We are not overlooking the fine literature that many associations have published: these efforts are excellent. Let's supplement present efforts with TV and consumer magazine ads.

Reports being received almost daily indicate that business will be good in 1956. This is an encouraging general statement. However, there's a personal responsibility if we intend to make business good for the woodworking industry. Investigate TV and consumer magazines for effective ways to reach this goal.

E. McDaniel

Editor



Beneke Corp., Columbus, Miss.—Moore Power Car shown pulling kiln load from storage tracks.

Move Kiln Loads FASTER — EASIER and CHEAPER with Moore Power Car

Put POWER to work—loading or unloading kilns — transferring kiln loads to and from storage.

Moore Power Transfer Cars for small or large mill—end or cross-piled loads—gasoline or electric driven—slow or high speed.

Write for information — do it today.

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Comments

FROM THE NATION'S CAPITAL

By Arnold Kruckman
Washington Correspondent

American Forest Products Industries is responsible for the statement that 750,000 persons are employed full time in the manufacture and distribution of lumber. There are over 65,000 sawmills in the nation. Products shipped by the industry in 1953—last available figures—were valued at $5,208,023,000.

The National Bureau of Standards is responsible for the statement that wood shingle roofs have a life expectancy 43 percent greater than asphalt shingle roofs.

Near Long Beach, California, they are building a plywood kitchen range of hardwood plywood. The range houses magnetic coils which set up a current in the cooking utensils. This does the actual cooking. The utensils are suspended 2" above the surface of the stove by magnetic repulsion, and the "wood range" never gets hot.

An increase of more than 5,000 cars—4,000,000 boxes—in this year's apple yield in the Wenatchee and Yakima Districts of Eastern Washington has spurred the production of shook manufacturers of the Pacific Northwest on an upward curve which has already brought the year's output 10% or more above last season.

The National Lumber Association reports manufacturing plants in California consume the largest amount of lumber followed by New York, Washington, Illinois and Michigan, in the order named. The latest report revealed that airplanes used 4,565,000 board feet; containers required 3,993,285 board feet; flooring took 1,149,635,000 board feet; furniture, 1,948,198,000 board feet; millwork, 2,149,676,000 board feet; gun stocks and fire arms used 126,697,000 board feet; prefabricated houses and panels for homes, 158,919,000 board feet; radios, phonographs and sewing machines, 122,455,000 board feet. The 53 products used a total of 12,211,671,000 board feet.

There is almost absolutely no doubt that tax reduction will be the principal objective of the next Session of Congress and the Administration.

During October and November hearings will be held in the U.S. Tariff Commission by the Interdepartmental Trade Organization which consists of the Department of State, Treasury, Defense, Agriculture, Commerce, Labor, Interior, International Cooperation Administration and the U.S. Tariff Commission. These hearings are preparation for the negotiations under the Trade Agreement Act to be held in Geneva, with 35 nations, beginning next January. The General Agreement on Tariffs and Trade—GATT—is an international agreement negotiation.

The negotiations are conducted on behalf of the United States by a rather complex and complicated arrangement under the general guidance of the Department of State. The Administration has been empowered by Congress to lower United States tariff rates as much as 15%—5% a year for three years—under the Reciprocal Trade Act extended by Congress this year after a particularly hot fight.

There are just short of a thousand types of foreign goods listed for tariff negotiation. They range from automobiles to Scotch Whiskey and account for more than 17% of the total imports into the United States in 1954.

Before we became a part of GATT our trade agreements were practically all bi-lateral which means two-nation. We are now following the European example of the multi-lateral trade agreement, which means many-nation agreements. The State Department says that it is beyond the power of any two Governments to deal effectively with the deep-rooted and complex problems of international trade. As these agreements are negotiated today they involve the differences of the economical, political, geographical, religious, cultural and historical characteristics of the countries party to GATT. Those included in GATT are the major trading nations of the free world. They conduct more than 80% of the world trade.

It is estimated approximately ten million Americans are dependent, directly or indirectly, upon earnings from foreign trade. Last year the State Department estimates our exports were equivalent in value to about $20,000,000,000 of our gross national products. State Department also is responsible for the assertion that since 1914 the excess of our exports over our imports has exceeded $100,000,000,000. It meets the criticism of American producers whose foreign markets are reduced or limited by restrictions by observing that such restrictions do not necessarily, in themselves, result in a net reduction in total U.S. exports. They may change the commodity composition but not the total value of trade. They claim our total sales abroad, as suggested, have been much larger than our purchases. Both the President and the State Department emphasize that American production is the greatest of any nation in history, and imply that foreign trade is chiefly responsible for this fact.

In the October and November tariff concession deliberations before the U.S. Tariff Commission, the items listed of particular interest to the woodworking industries were these: paints;

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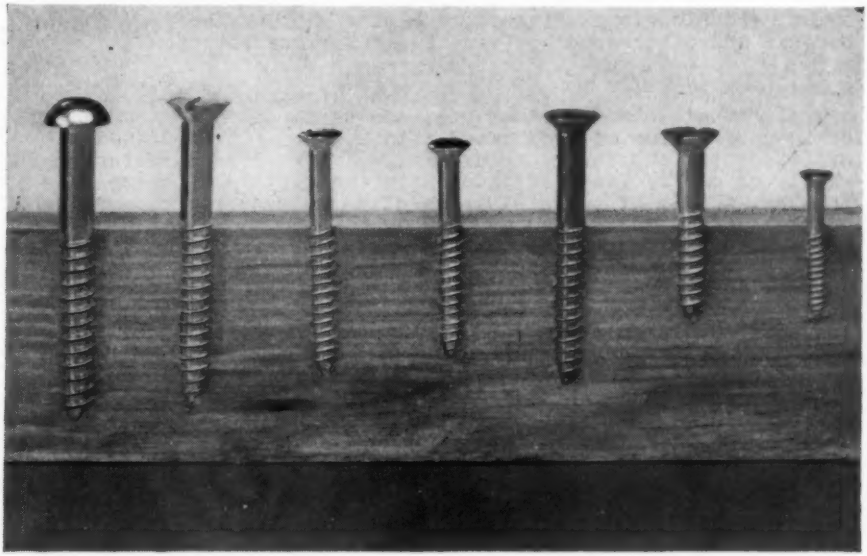

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Their vast inventory and prompt delivery can help improve your production schedule

Continental offers you a selection of over 40,000 styles and sizes of standard wood screws — far more than any other producer in the industry.

Whatever your own needs may be . . . Phillips recess, slotted, clutch recess, ornamental heads, or any type of metal or finish . . . you can be assured that Continental's vast selection will guarantee you the most effective style. And all standard wood screw orders are promptly shipped out within 24 hours.

It will benefit your production schedule to check with Continental. They offer you the world's widest selection of wood screws.

Continental Screw Co.

Manufacturers of Holtite Fastenings

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varnishes; every type of wood tableware, kitchenware; stocks for guns; briar root or briar wood; ivy or laurel root, and similar wood unmanufactured, or not further advanced than cut into blocks suitable for the articles into which they are intended to be converted. Mahogany in the form of sawed boards, planks, deals and all other forms not further manufactured than sawed, and flooring. Plywood: Red pine and Douglas fir; boxes, barrels and other wood containers for various purposes.

Baskets and bags, wholly or in chief value of wood, or compositions of wood. Furniture, and parts of furniture wholly or in chief value of wood; wood moldings and carvings used in architectural and furniture decoration; bent-wood furniture wholly or partly finished, and parts thereof; paint brush handles, wholly or in chief value of wood. Manufacturers of wood or bark, or of which wood or bark is the component material of chief value; brush backs; clothes pins; wood faucets and spigots; wood shuttles and bobbins; spools wholly of wood; wood buckles and buckle slides; clasps; stocking darners or darning lasts; carriages, drays, trucks, and other vehicles and parts thereof; badminton-racket and tennis-racket frames; wheel barrows, and laminated wallboard.

Violins, violas, violin cellos, and double basses, of all sizes, wholly or partly manufactured or assembled, made after the year 1800, and unassembled parts. Cigar and cigarette boxes, wholly or in chief value of wood; sawed lumber and timber, not further manufactured than planed, and tongued and grooved; teak.

During October and November the U.S. Tariff Commission hearings, in connection with its "peril point" investigation, were held in obedience to Section 3(a) of the Trade Agreements Extension Act of 1951, to determine the extent to which the United States concessions on listed products may be made in the negotiations at Geneva without causing or threatening further serious injury to a domestic industry producing like or directly competitive products. The products listed for consideration will be enumerated in the next Washington Letter to WOOD WORKING DIGEST. It is anticipated some of the discussion and some of the listings and some of the instructions for the guidance of the delegation which goes to Geneva will be particularly interesting to the woodworking industry. It also is likely that additional GATT countries will be listed as participating in the multi-lateral negotiations at Geneva.

The U.S. Tariff Commission expects that other countries will participate in the negotiation with the United States besides those that are members of GATT. In other words, countries from various parts of the world are expected to negotiate outside of GATT directly among themselves. The Committee for Reciprocity emphasizes that there is no limitation on the products on which the United States may request concessions. And those who wish to do so have been requested to submit information and opinion concerning wages which are sub-

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Even if you've invested as little as $239 in shop equipment you may not be enjoying the profit-making benefits of a DeWalt®. We invite you to compare your present equipment and shop methods with these AMF De Walt features and operating advantages:

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standard in exporting countries as recommended by the President to Congress last year in order that the United States may avoid concessions in such cases.

GATT has been in existence over seven years. The State Department is particularly proud of the fact that during the three major conferences abroad multi-lateral agreements were worked out which resulted in approximately 58,000 tariff concessions—either tariff reductions or commitments against tariff increases. Both the White House and the State Department join in the statement: "There is no comparable record of achievement in this field."

The Bureau of Foreign Commerce of the Department of U.S. Commerce is responsible for the statement that the geographic distribution of U.S. commercial exports in the first half of 1955 differed considerably from the trade pattern of a year earlier. The shifts reflected widely varying degrees of participation by major areas abroad in the expansion of U.S. export sales. The statement asserts: "In the first half of 1954, the shares of non-military exports going to the three principal areas of destination—Latin America, Western Europe and Canada—were almost equal at approximately one-fourth each. In the more recent period, Western Europe took 30% of the total and was by a substantial margin the leading foreign market for U.S. goods. The Canadian share remained virtually unchanged at 24%, but the proportion going to the Latin American Republics declined by nearly 3 percentage points, and the share of the Far East also shrank. Shipments to Western Europe, exclusive of military goods, rose to $2,100,000,000, as compared with $1,600,000,000 in the first half of last year. There was marked shrinkage in the Brazilian and Japanese markets. U.S. imports during the period of January-June, 1955 of sawmill products were reported as $152,500,000, the greatest volume coming from Canada, being $135,700,000.

The Department of Commerce also reports that Greece seeks to buy hardwood ties in the United States; and that India, with American funds, is buying $6,300,000 worth of various commercial supplies. Incidentally, Clem Johnson, recent President of the National Chamber of Commerce, who has just returned from a prolonged trip to Asia, told the Board of the National Chamber of Commerce last week of a poll in India while he was there. One question was asked: In event of a war with the United States or Russia which way should India go? The answer was "with the United States, 7%; with Russia, 93%." Meanwhile a six-man trade mission will represent the United States at the Indian Industries Fair in New Delhi from October until December.

Coming Next Month . . . .

Stories on electronic gluing,
veneer manufacturing and another chapter
in the series on "Fundamentals of Wood Machining."

Black & Decker® electric drills mean high speed, low operating cost, more convenience — and they're

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The power, speed and accuracy of Black & Decker Drills mean faster, better jobs, lower costs. The B&D-originated pistol-grip and trigger-switch, the lightweight, *balanced power* guarantee reduced operator fatigue! And unexcelled workmanship throughout makes your B&D Drills thoroughly dependable, inexpensive shop workhorses.

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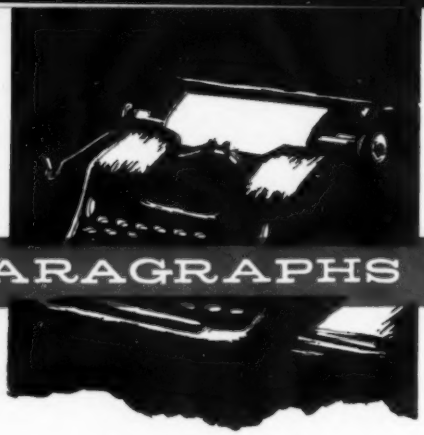
The *heart* of your electric tool is the motor—*built* by Black & Decker! All the power you need *and then some*—because each motor is built for a specific tool and the job it must do! B&D motors always *stand up!*



POINTED PARAGRAPHS

Great news in Washington these days is the National Housing Center, officially dedicated on October 3. Be sure to visit this center on your next trip to Washington. The N.A.H.B. convention is January 22-26 in Chicago.

Twenty-nine more furniture manufacturers have joined the National Association of Furniture Manufacturers recently. Folks are still talking about the Fair held by this group in August. Next year's event—the second annual Supply, Equipment and Fabric Fair—will take place August 26-30, 1956.

Higher prices will keynote the October markets. The High Point Show opened October 23. Steadily mounting material costs are held more to blame than increased labor costs.

Consumer spending is setting a fast pace. In the first six months of 1955, consumers spent 94c out of every dollar of income. How much is the woodworking industry receiving? The Southwest is capturing a bigger share of the furniture market: 3% in 1950, 5% in 1955.

Homebuilding starts took an upward turn in August. Privately financed housing set an annual rate 8% higher than last year, and 30% greater than in any of the preceding three years.

The ends of 8' timbers have been used to line the sides of a new close-quarter Air Force firing range. The timbers can be fired at from all angles with little or no danger that the bullets will ricochet. Wood also has the advantage of being able to withstand great shock and absorb sound.

Prices of hardwood lumber are rising in the Southwest. Strong demand and tightening supply are credited in part. Ash, oak and gum are included

Save Time Save Money

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DUO-FAST automatic TACKERS

DUO-FAST AIR TACKERS cut production costs on case backs, drawer guides, and numerous other jobs.

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DUO-FAST GUARANTEE assures you of free service on Duo-Fast machines. An important money-saving feature.

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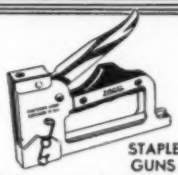
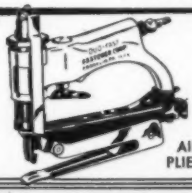
WRITE TODAY FOR YOUR COPY OF THE DUO-FAST CATALOG & PROFITABLE SUGGESTIONS

The *right* machine for each job is important. You'll find the *right* one in the **DUO-FAST LINE**



STAPLE GUNS

STRIKE TACKERS



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1955 Cadillac for your '29 Ford?

21" picture screen for your old 12"?

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Thermatron

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LIBERAL TRADE-IN ALLOWANCE on your old, smaller high frequency generators...from hand guns up!

You've wanted newer, larger and more automatic equipment for your electronic edge bonding and wood gluing operations

You've wanted newer, larger and more automatic equipment for your electronic edge bonding and wood gluing operations . . . But your present investment and the additional cash outlay needed was too big for your budget.

NOW, Thermatron offers a plan whereby you can turn in your present high frequency equipment for a liberal allowance toward newer, larger units that increase production and cut costs.

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Thermatron 20 KW High Frequency Generator with automatic controls, specially designed for high production edge bonding. In actual operation, together with a batch-type press, Thermatron's automatic power control has reduced edge bonding production time over previous electronic installations by at least 33⅓%

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in the group which has undergone price changes. More increases may come as orders and shipments outstrip production.

Conference held by members of the American Institute of Decorators indicates that "the most striking feature of modern American home life is snowballing trend to live more informally and to furnish our homes in simpler and more tasteful ways."

SPA research committee has received the suggestion that the possible future application of atomic energy to lumber manufacture, specifically the use of radio-active isotopes to control the thickness and determine the moisture content of lumber be investigated.

A method of applying thin layers of tungsten carbide to steel surfaces, developed by engineers of Carboloy, is reported to be different than other methods developed for carbide coating and may overcome certain designing limitations associated with solid carbide parts.

Rise of hardboard production is a signpost bidding landowners to grow trees as crop. Hardboard production and consumption has been increasing each year—especially large increases in the last three years.

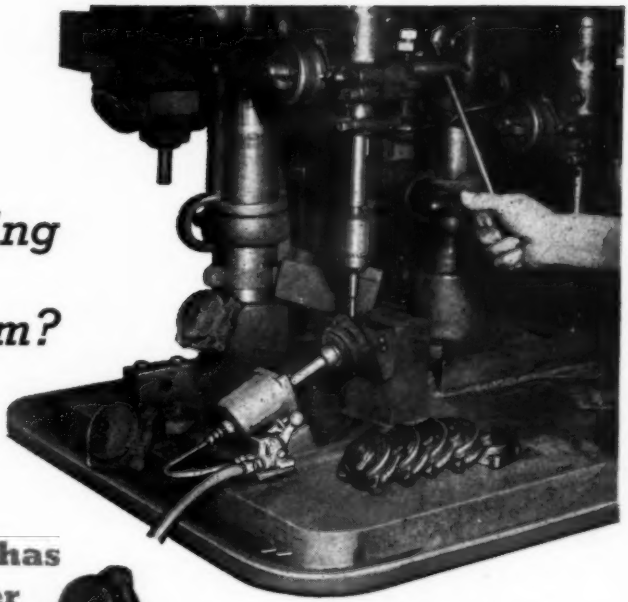
Tremont Lumber Co., Joyce, La., is practicing what the entire lumber industry preaches—"use wood." The company is now completing a building program that emphasizes the structural and economic advantages of wood, generally, and in its use as an engineered material. An example all of us should follow.

Eleven new plywood mills are being hammered together in the rugged, heavily forested coastal strip stretching from Puget Sound to San Francisco Bay. Sales of fir plywood, the basic building type, have climbed seven times as fast as steel sales in the last 15 years.

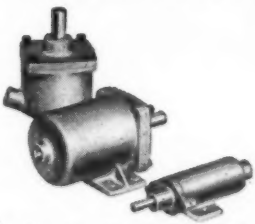
An industry-wide warranty for upholstered furniture was okayed by N.A.F.M. members during their recent Chicago conclave. The warranty, use of which will be voluntary on the part of individual manufacturers, extends a six-months guarantee on workmanship and construction . . . color permanence and wearing quality of fabrics is not covered. Initial plans for a one-year warranty were scrapped after vigorous opposition from N.R.F.A. officials who favored a 90-day time limit.

Read the new series on plywood utilizations. If you know of any unusual applications of plywood, please let us know. We want to cover as many uses as possible in this new series.

Clamping Problem?



SCHRADER has the answer



Schrader Air Clamping Cylinders are available either base or leg mounted, in 1", 2¼" and 3" diameters delivering a 2" or 1" stroke. A wide selection of Schrader Valves is available to operate this equipment.

The **Schrader Air Clamping Cylinder** is actually a bantam air cylinder that can *add several minutes* to each worker's production hour . . . eliminate the need for slow, manual clamps.

Why not save time—and operator annoyance—with fast, convenient Schrader Clamping Cylinders, as so many other industrial plants have already done? Mount these Schrader Clamping Cylinders anywhere. Actuate them automatically or manually.

For full details on the models available—or any of the hundreds of air control products in the complete Schrader Line—write today. Or, if you prefer, fill out the coupon below.

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Extra Durability

Prefabricated homes are smart looking. They are economical and quickly-constructed. But, more important, they are rugged, durable and built to last. And Penacolite Adhesives are often largely responsible for this strength and durability.

Penacolite Adhesives are used extensively to bond exterior and interior plywood sheets to the vertical studs, forming sound, resilient panel units that are very strong, yet lighter and easier to handle than solid wood.

Penacolite bonds are completely waterproof, and remain as strong as the woods they join through all types of weather conditions and temperature changes. Furthermore, they *retain* their strength, because they are unaffected by age, long exposure, or the shrinking and swelling of wood.

Penacolite Adhesives, manufactured by Koppers, have found wide acceptance in various wood bonding fields—industrial, marine, farm and others. Write today for further information about these versatile adhesives and their many uses. Koppers Company, Inc., Chemical Division, Dept. WD-115, Pittsburgh 19, Pennsylvania.

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PENACOLITE® RESORCINOL ADHESIVES

The original, waterproof room-temperature-setting adhesives.

MASS PRODUCTION FOR BETTER HOMES

BY ALLEN DIBBLE

Director Public Relations, National Homes

A HOUSE comes off the production line at National Homes every 11 minutes—and the trend is up! This is the current record at one of the nation's outstanding prefabricated home builders.

Assembly-line techniques have been utilized for everything from refrigerators to toys. There are many reasons for the increasing popularity of the prefabricated home. Cost: labor savings, time savings and materials savings; ability to construct the home regardless of weather; and better homes for less money are a few of them.

By adopting assembly-line and mass production engineering techniques, National Homes Corporation has become one of the largest producers of homes in the United States. Whether a National home costs $6,000 or $40,000, quality is assured by standardization of methods and materials.

National Homes builds entire wall, ceiling and roof sections in its plants at Lafayette, Indiana, and Horseheads, New York. Production started this fall in a new plant at Tyler, Texas.

Planning for these thousands of new homes starts with the design. There are over 30 National Homes basic floor plans, with over 200 exterior variations. All are architect-designed by Charles M. Goodman, a nationally known master architect in the home field.

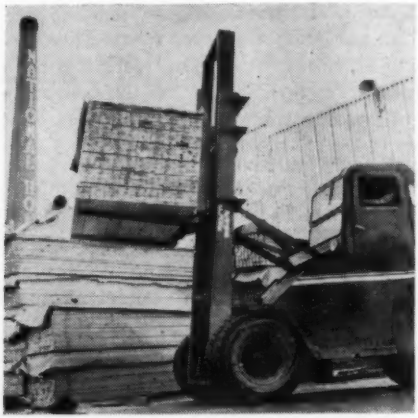
Building plans are drafted by the architectural staff according to basic designs created by Charles M. Goodman.

Modern factory methods put a premium on using the best materials. National Homes uses No. 1 kiln-dried lumber for all structural framing. Because materials are purchased in large quantities—more than 8,000,000 board feet of lumber are required each month—there are important savings that can be passed on to the home buyer.

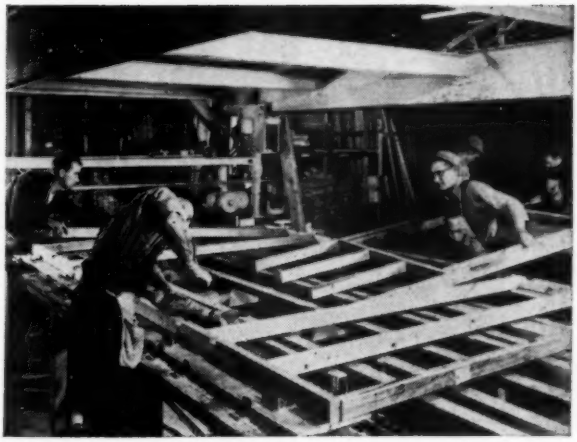
A TRIP THROUGH A PLANT

Beginning in the yard you see carloads of lumber and plywood arriving on sidings and being stockpiled. Normally, there are about 5,000,000 board feet of lumber in that yard. Quantities of other materials, such as wallboard and roofing, are kept in warehouses, along with the appliances that go with the homes. Inventory of materials is turned over 13 times a year. This high turnover of capital means low costs.

Quality materials are used in all National homes. Here is No. 1 kiln-dried West Coast lumber used in all structural framing.



Fork lift trucks keep the lumber moving continuously from the yard to the production line inside the plant.



Structural strength starts at the framing jig. Here the pre-cut pieces are held firmly in place — square and accurate—until craftsmen nail them together to form a rigid wall section.

For nine months of the year, there are three shifts, round-the-clock, and two shifts throughout the remainder of the year.

Inside the plant, the lumber goes to a variety of special machines to be cut and shaped to exact specifications. Multiple-operation machines get the lumber ready for the assembly line in seconds. A double-end tenoner saw, for example, can make as many as 23 different kinds of cuts, depending on the job to be done. It can cut a carload of lumber in two hours. Especially engineered by National Homes, another machine cuts rafters to length, makes the necessary notches and miters, and drills holes for the lag bolts. All this is done in a single operation, as the lumber moves through the machine.

At the start of the completely mechanized assembly line, pre-cut pieces for

Operator is applying adhesive to bond the surfacing panels to the structural frame.

After panels have been fitted into place, they are nailed along all bearings to reinforce the bond for lifetime service.

Fire-resistant insulation is inserted between studs in all exterior wall sections and held firmly in place by adhesives.

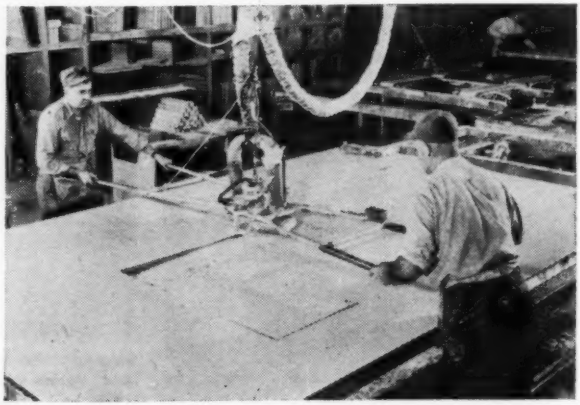
the structural frame are placed in fixed metal jigs. These jigs hold each piece of lumber firmly in place—square and accurate—while all the members are being nailed together.

Working at the framing jig—built to a comfortable working height—the craftsmen have easy access to the framework and to the tools and materials. They never have to work in awkward positions. The work is brought to them. They are not required to move about for tools. They can work not only faster but also better.

BETTER STRUCTURAL METHODS

Under the more favorable circumstances of factory operations, it is possible to use new and improved engineering principles in new and better ways. For example, a wall far stronger than required by performance standards set by the U. S. Bureau of Standards and nationally recognized building codes can be manufactured using the "stressed-skin" principle—the type of construction that gives airplane wings their tremendous strength and rigidity.

To achieve this engineered structure, all parts are tightly bonded into a single, strong section. In building a National home, powerful, waterproof adhesives are applied to the studs, set squarely on 16″ centers, and the wall surfacing material is laid over the entire framework. To reinforce this bond, the panels are nailed along all bearings. Guides and special hammers are used by workers for this operation so that they can cover the surface with speed and accuracy.



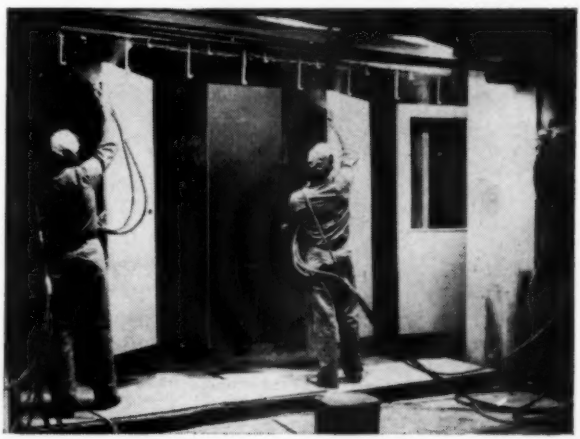
Power tools speed the work on production lines, which are better than 75% mechanized. Here window and door openings are cut with precision by a fast routing machine.

High speed machines bore and rout out for the hardware that will be fitted on the doors before they go to the assembly lines.

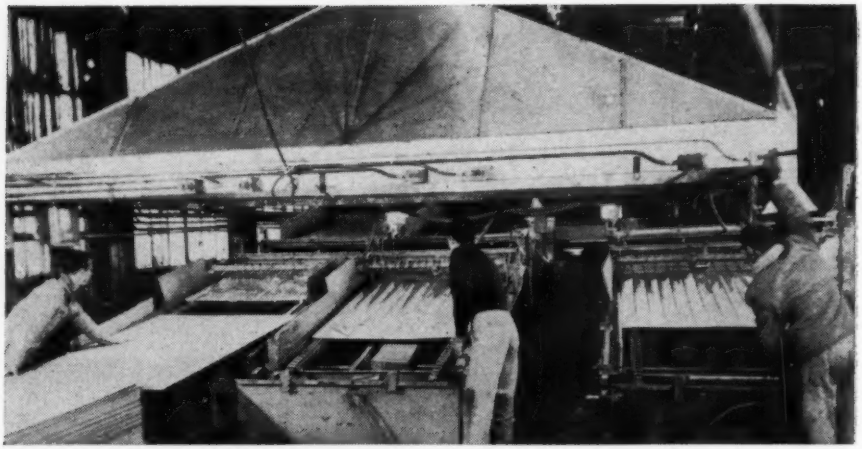
The wallboard used for interior surfacing is easy to work with on the production line. Window and door openings are cut with precision by a fast routing machine as the panel moves along the line.

Halfway down the assembly line, a section is turned over mechanically and work is begun on the other side. In the production of exterior sections, fire-resistant insulation is installed and held firmly in place by adhesives. Then the pre-assembled windows and doors are installed, including flashing and exterior trim.

When the exterior surfacing of the section has been put in place, it is bonded to the structural framing with



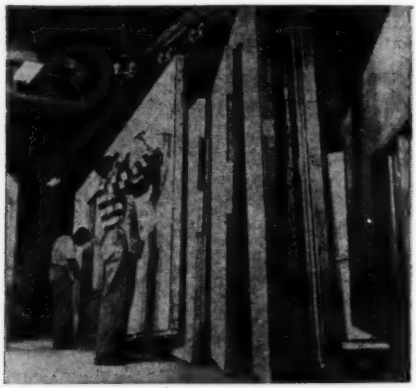
Spray painting is used for the two coats given all doors, interior trim and other parts. After the first coat, the parts pass through a quick-drying rack and later are returned for the second and final coat.



Flow painting, an assembly line technique, has been adapted to construction by National Homes to apply a deep stain to the exterior surfaces of grooved plywood, giving a finish that is highly popular.

adhesives and is nailed. This completes the "stressed-skin" construction of the section. The outside finish, whether it is shingles, weatherboarding, or brick, is installed at the building site after the house has been erected.

The section then is lifted mechanically to a conveyor system which is part of the assemby line. The interior door and window trim and window screens are installed. At this time, there is a final inspection to satisfy the quality standards of the factory operation and the Union label is stamped on. Continuing along the conveyor system the section joins other sections that have been similarly constructed on other production lines, and all move toward the loading dock.



Finishing touches are applied to the wall sections as they come off the assembly lines and converge at the loading dock for shipment. Here the men are putting trim on the doors and windows.

SPECIAL PURPOSE MACHINES

Meanwhile, in other areas of the plant, component parts of the house are being produced by machine methods. Doors and door jambs are prepared for the hardware by fast routing machines that make the mortises and drill the necessary holes in a matter of seconds—and do it with greater accuracy than is possible by hand operations that would require much longer time. A nailing machine, especially engineered for the job, secures the roof sheathing

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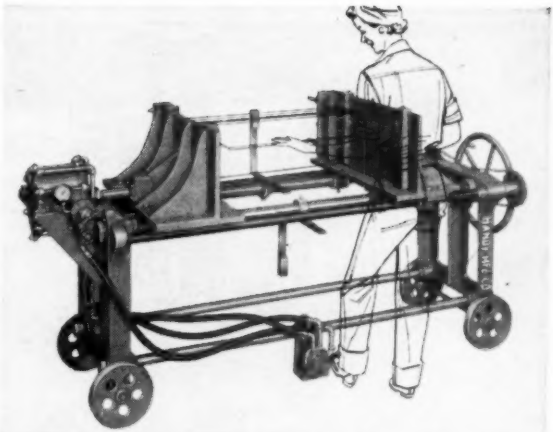

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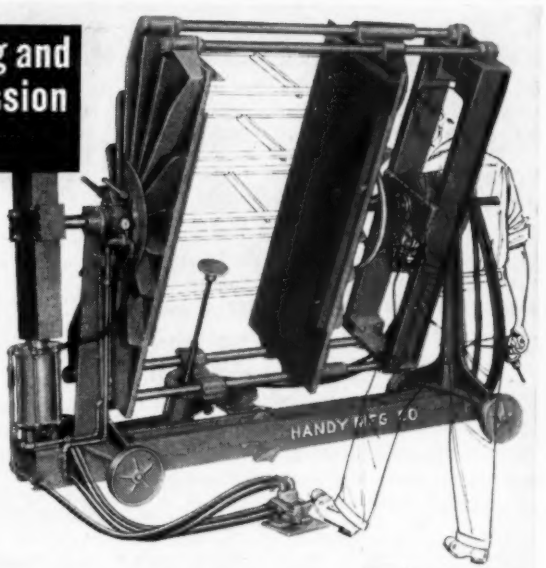

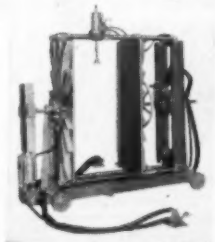

This is worth checking into right now. Write, wire or phone.

HANDY Manufacturing Company

2436 West Lawrence Avenue • Chicago 25, U.S.A.

Loading dock receives the sections and parts after a final inspection to assure strict adherence to quality standards. The shipping lists are carefully checked as each National home, complete with all equipment, is loaded into one of the waiting trailers.

to supporting rafters. Its eight hammers, operated by compressed air, drive nails into the sheathing along each rafter. As the machine moves across the jig, the sheathing is edged on both sides by twin saws. The entire job is completed in 30 seconds.

At the loading dock, the sections and component parts come off the conveyor system according to a scheduled sequence. Each bears a production number designating the home of which it is a section or part.

When a National home leaves the factory—usually on one of a fleet of more than 250 transports that deliver the houses to the building site—it is scheduled to arrive in the early morning. By nightfall it is standing—weather tight and ready for finishing.

The job of putting on the finishing touches requires a few weeks. Nearly 60% of the total cost of the house goes into wages for local workers at the building site.

INTEGRATED OPERATIONS

Much of the success of National Homes is due to its success in integrating its purchasing, manufacturing, merchandising, transportation, and financing operations. Few producers even attempt to operate in all these fields and none has done it so successfully as National Homes. The firm not only produces the house but sees that it is sold, delivered to the site, and properly financed. There is even a follow-through after the sale in servicing operation. All this simplifies home buying for the purchaser and gives him greater assurance on the biggest single financial commitment he will make in his whole lifetime.

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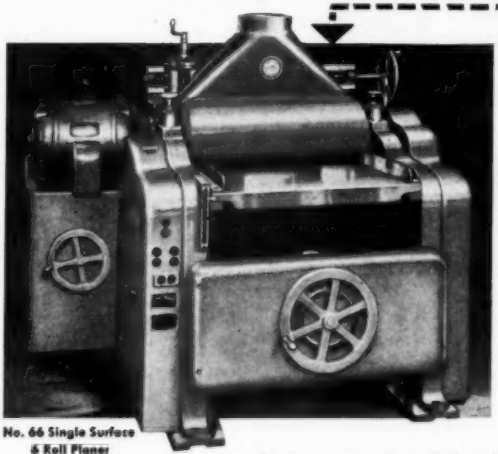
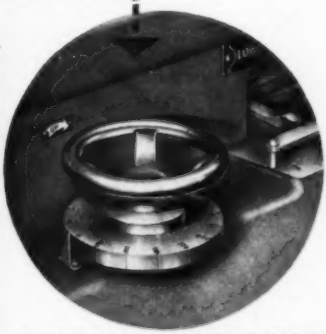


No. 66 Single Surface 6 Roll Planer



***INSTANT* MICROMETER CONTROL OF TOP OUTFEED ROLL**

Anyone experienced in planing will quickly appreciate the great value of this device which permits instant and absolutely accurate adjustment of the top outfeed roll. It requires just a few seconds for the operator to adjust the roll to the ideal distance below the cutting circle and thus to eliminate a major cause of planer "marking."

Previous to the advent of this micrometer control, adjustment of the top outfeed roll in all planers required individual adjustments under each roll box — a tedious job with varying results. Consequently, too often the roll was left in one position and as the knives wore the roll became too low, stock butted against it and "marking" occurred. And on the other hand, when adjustments were attempted a great deal of time was consumed.

This new, patented feature available on Models 44, 66 is just one of a great many very important developments found EXCLUSIVELY in BUSS cabinet planers — one reason why they will give you the most for your money in fine finish planing. There's a model and size to exactly fit your needs. Write for descriptive bulletins.

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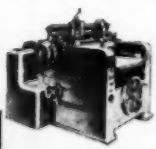

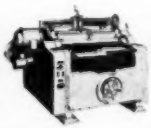

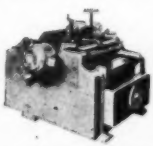

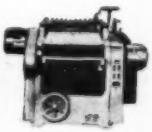

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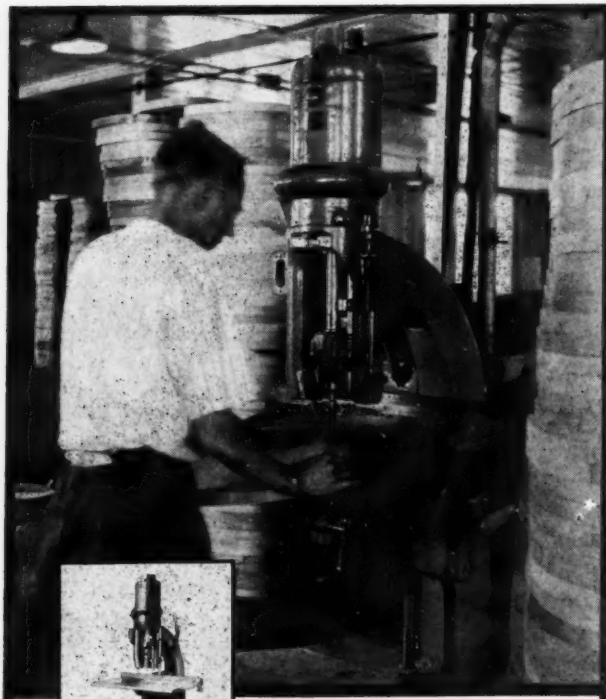

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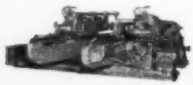

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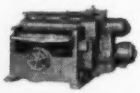

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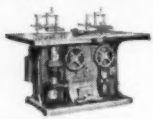

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E. M. C. --- FORGOTTEN FACTOR ?

By
F. W. Mohney

THE commercial drying of wood today is based on the technique of establishing variable temperature and humidity conditions which thereby afford a lower equilibrium moisture content (E.M.C.) for the species dried. Often forgotten is the fact that the equilibrium moisture content inside a plant also varies with the climate and seasons.

On the whole, the use of air-conditioning in woodworking plants is in its neophyte stage. Many supervisors, knowing that the resort to air-conditioning is not widespread, have neglected to really figure whether or not it has a practical application for them. The term "air-conditioning", in its ambiguity, is perhaps the scent which throws the usually competitive-sharped noses of woodworking management off the trail. Oft confused with summer comfort cooling, air-conditioning is sadly misnomered. Sadly that is, for the management which may have this concept and which experiences such things as open joints appearing a day or two after processing, end-checking of corestock and veneer, and a myriad of other defects which can be the symptoms of E.M.C. sickness.

While in certain plants the air is starved for moisture, others find excess humidity. Even in the same plant, but through different seasons, opposite extremes of moisture conditions can occur. It is therefore necessary to consider air-conditioning in its true sense. If we vary the basic characteristics of air we "condition" it accordingly. The principal factors which interest the woodworking trade are temperature and humidity. Whether we decrease or increase either of these basic characteristics we are conditioning the air.

Comfort is still important in a woodworking plant, but the problems I mention can be solved with an improvement in comfort.

If for discussion we divide the country simply into north and south, shutting off the extreme areas such as the damp coastal region and the arid southwest, there are two basic problems which occur. From Florida north, the low temperatures of winter mean seasonal heating. The degree-day relationships increasing the further north we look. At the extreme low, weather conditions often drop to 0° F. with 80% R.H. When this air is heated its ability to contain moisture increases and the E.M.C. conditions drop proportionately with the new low relative humidity.

To calculate what the relative humidity to contain moisture increases and ditions I have "dehumidified" the rather "watery" calculations into the following reasonably simple but accurate formula.

$$H_1 = \frac{\dfrac{W_o \times H_o \times .01}{T_1 \times 1/T_o}}{W_I} \times 100$$

Where: H_I = % R.H. Indoors (at temp. T_I)

H_o = % R.H. Outdoors (at temp. T_o)

W_I = Saturated weight of water/cu. foot of air at indoor temp.

W_o = Saturated weight of water/cu. foot of air at outdoor temp.

T_o = Air Temperature Outdoors (absolute).

T_I = Air Temperature Indoors (absolute).

Note: W_I and W_o can be found in any psychrometric table or diagram.

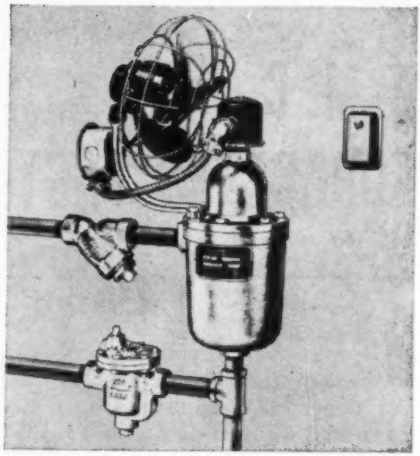
Thus: (at 0° F, 80% R.H. outdoors; 70° F. indoors)

$$H_I = \frac{\dfrac{.000,067,4 \times 80 \times .01}{529.6 \times 1/459.6}}{.001,153} \times 100$$

H_I = **4.67%** R.H. Indoors at above conditions.

The E.M.C. for this indoor condition would be roughly 1%, bearing in mind that these conditions do exist in our own north country and in a belt where many woodworking plants are located.

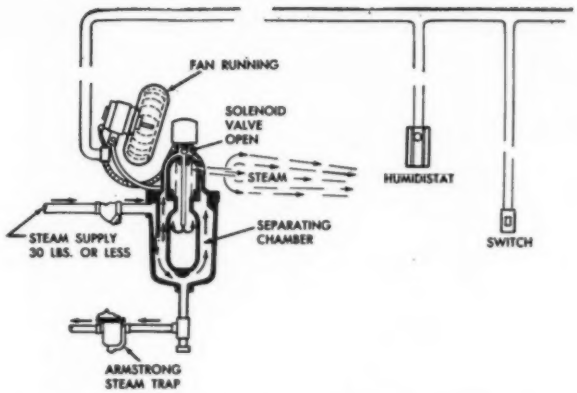
Clearly, there is a need here for humidification. Two basic factors can be varied to achieve this result. Lowering the temperature indoors in the above problem to 20° F. would give about 6½% E.M.C. If you decide on this step my next article had better be on industrial relations! I will remind you too that hardwoods will change dimensionally .001" per foot per 4° F change in temperature. The most practical step then is to add moisture to the air.



Armstrong type C-2 electrically controlled steam humidifier. Shown complete with fan, strainer, steam trap and humidistat.

Humidification becomes our air-conditioning problem, one which can be resolved in several ways.

An excellent humidification source is low-pressure exhaust steam, if such is available in your plant. Water-spray devices are also used but, depending on the water analysis, these tend to leave deposits of minerals and salts which are annoying if not serious. There is also a slight heat loss while evaporating the raw water. On the contrary, steam-humidification adds its heat content as well as water content to the room, thereby taking the place of heat you would have provided if you heat your plant anyway. With low pressure steam



Schematic diagram of operation of Armstrong type C-2 humidifier. When humidistat calls for moisture, the electric circuit to fan and solenoid valve is closed. Steam entering humidifier body passes through separating-silencing chamber and out discharge orifice to atmosphere. Fan aids in steam dispersal.

you can probably get sufficient humidification from the existing piping without increasing its size, because of this feature. In woodworking plants air-washers, which salvage heated air normally expelled by dust-collectors, are used to advantage to increase the humidity. Automatic control is more difficult with such a system but it is not impossible.

Don't forget the practical engineering approach either. Many plants could use moisture from high-humidity areas such as veneer dryers or kiln vents and provide very economical humidification. These "do-it-yourself" plans have a tendency to wander away from desired conditions, however, if automatic control is not rigidly applied. If you have seen excess moisture strip paint from walls and piping overnight on a sub-zero day you will know what I mean. It is cheaper in the long run to engineer human fallibility out of your plants when possible.

At the other weather extreme we have high temperatures and excessive humidities. Even in the northeast con-

High capacity type air controlled steam humidifier discharging into heated air duct at Rway Furniture Co., Sheboygan, Wis.

Steam humidifiers at Vilas Furniture Co., Cowansville, Quebec. Humidification of this plant is estimated to be saving $5,000 to $6,000 annually through elimination of stock losses.

ditions indoors will quickly reach 10% E.M.C. This period in the north is usually disregarded since the installation expense is hard to justify. I contend that accurate loss and cost figures would often prove such reasoning in error. To the south the problem is acute. Here temperatures of 100° F and humidities of 80% are not unreasonable. Again we revert to air-conditioning but this time in an attempt to lower the humidity; and the temperature from the comfort standpoint.

De-humidification is more costly but can be accomplished in a number of ways. Cold well water may be used or, ironically, even steam! Of course refrigeration is the best known, most widely used system, but only a study of your plant conditions will determine if the other methods are not more feasible.

Air-conditioning in woodworking may be young but certainly has desirable and important advantages. And, after all, you can have all this and comfort too!

12-Point, Design Check-List for Humidification Requirements

To arrive at the water vapor requirements for your plant areas, you must break the plant down into departments or rooms and obtain the cubical contents of these. Consider each area as a unit and then follow these points.

1. Determine the lowest design conditions for your section of the country. These conditions usually run from 0 to -20°F. The lowest reasonably sustained humidity conditions can be obtained from the closest weather station. However, northernmost regions will probably run from 75% to 80% R.H. outdoors.

2. With the formula

$$H_I = \frac{W_o \times H_o \times .01}{\frac{T_I = 1/T_o}{W_I} \times 100}$$

calculate the humidity indoors at these conditions.

3. Using psychrometric tables found in most heating and ventilating tests, determine the weight of water vapor in pounds per cubic foot for your design conditions. Multiply this figure times the room volume to find the existing moisture weight.

4. Again using the formula in item No. 2 above, and the psychrometric tables, determine the moisture in pounds for the same volume but at desired humidity conditions.

5. The difference between the two former amounts is the calculated mois-

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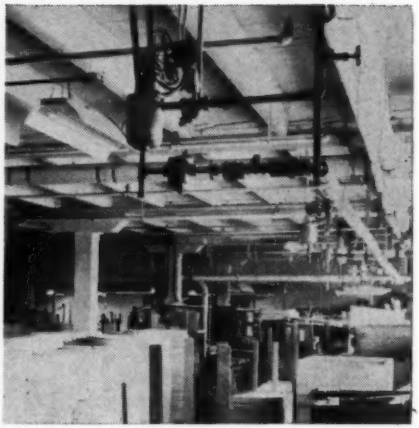

Humidifiers installed at Mersman Bros. Corp., Celina, Ohio. This plant credits humidification with eliminating 10% to 20% stock loss formerly caused by warping and checking.

ture requirement in pounds.

6. Determine what, if any, water vapor is already being added to the room by industrial process or through air-washing systems, etc.

7. Decide the normal number of air changes per hour for a building of your type. (You might consider if winter wind conditions are relatively severe in your area. If you are uncertain, a reasonable estimate might be 3 to 4 air changes per hour.)

8. Find out how many cubic feet of air are being forced from your area through blowers and fans—don't forget the dust collection system and paint spray-booths!

9. From the previous information, calculate the number of air changes per hour.

10. Multiply the estimated number of air changes per hour times the calculated, desired water vapor addition in

pounds (Item 5) to get the total required moisture addition.

11. Select the commercial humidifier you like and ask the manufacturer for its rated output. (One of the best steam humidifiers available will deliver almost 100 pounds of water per hour at 5 psig.) Check the "high-load" pressure at the end of the system, however, for the same unit there, at say 3 psig., will only deliver 75 pounds of water per hour.

12. Divide the water requirements by the manufacturer's design load per unit to determine the number of units needed. (I suggest that you do not exceed your initial estimate until you have observed the first year's operation since calculations are based on lowest conditions and are therefore usually adequate throughout most of the heating season.)

Photographs used in this article are through the courtesy of Armstrong Machine Works, Three Rivers, Michigan.

HARDBOARD FOLDER

"Granite Board," a newly published folder, describes a remarkable new core material for plastic laminates and plywood. This core material is said to possess maximum strength equally in all directions as well as being dimensionally stable, and to have bonding facility, bonding strength, and workability in every direction on any plane.

The folder describes granite board as improved over earlier cores in nail and screw holding ability, holding nails and screws close to the edges without splitting. Information regarding available sizes and economies is included.

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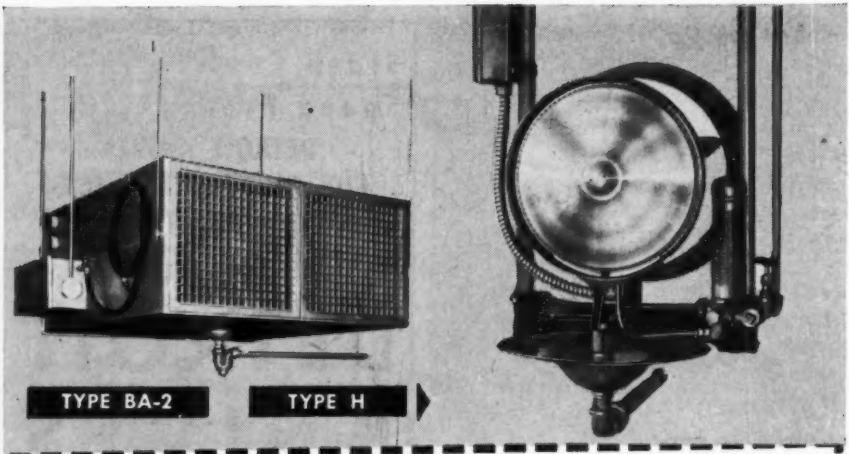

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WINSTON-SALEM, N. C.

PROGRESS IN WOOD OFFICE FURNITURE

By
Robert A. Spelman
Executive Secretary,
W.O.F.I.

ROSY expressions of optimism are generally expected from the trade association secretary when he talks about his industry and association. I hope that, this once, I may be excused from following the prescribed pattern of behavior.

In lieu of this, I'll simply quote from a Wood Office Furniture Institute business report based on WOFI manufacturers' orders for 1954 and 1955:

"Net desk orders increased by 33.11% in a comparison of the first five months of 1955 with the same period in 1954. Chair orders moved upward 29.44%. In the 30-day period extending from April, 1955, through May, 1955, desk orders rose by 23.81%, and chair orders increased by 14.19%."

These figures, I believe, constitute solid evidence of what is being accomplished in the wood office furniture industry. More than this, they demonstrate to us that we are following the right path toward our twin goals—to improve our products constantly, and to employ the best techniques available to tell the public what we have to offer.

Our campaign for product improvement is based on seeking better and more attractive designs, and utilizing research to make wood office furniture even more durable and sturdy than it has been in the past.

To discuss the former point, it is noteworthy that every WOFI manufacturer who displayed his products at the last National Office Furniture Association's convention-exhibit in Chicago introduced new designs. Our trend, and we think it is a solid one, is toward contemporary design, lighter lines, emphasis on function as well as beauty and strength, and lighter finishes. Today, we have "boomerang" tops, cane fronts, and broader pedestals as typical features of contemporary styling.

Among the lighter finishes produced by our members are African mahogany, a new, red mahogany finish of stunning texture and richness; WOFI's standardized and well-accepted Softone, and frosted walnut.

These styling advances, coupled with WOFI members' solid reputation for fine craftsmanship, have done much to win broader acceptance of wood office furniture among both dealers and consumers.

Research has played a large part in our efforts. Several years ago, the

The modern pigmented walnut secretarial desks are designed and produced by the Leopold Co., Burlington, Ia. The walnut chairs are by the W. H. Cunlocke Chair Co. White oak plywood tile flooring and mahogany plywood paneling are also used in this office.

Timber Engineering Co. licked one of the few problems which had been inherent in the manufacture of wood office furniture—the swelling and sticking of drawers. Wood drawers never caused trouble due to bending, rusting, bending or buckling, but they did stick sometimes. Today, chemical treatment which renders drawers impervious to changes induced by humidity is standard practice in the industry.

Similarly, research developed densified, splinter-proof desk legs—a development which created much editorial attention as a secretarial "nylon-saver."

More recently, WOFI, with the aid of its research organization, undertook an investigation of the use of ultra-violet absorbers in finishes. Although the natural mellowing effect of wood is preferred by many users, others—particularly those who wish to order pieces which exactly match those purchased earlier—desire absolute stability of colors. This has now been provided.

One WOFI member recently completed an interesting experiment. A wood office desk has been sitting in direct sunlight in his plant for nearly a year. Half of the top area was treated with the color stabilizer; half was not. In addition, half of each half—to introduce a small complication—was uncovered. The other half was not.

The treated and untreated surfaces show a striking difference. The untreated surface has "mellowed" in the sunlight. There is no discernable change in the treated surface, even after a year's exposure to direct sunlight. More than that, the uncovered half of the treated surface is indistinguishable from the area which was covered.

The manufacturer in whose plant the experiment was conducted was so enthusiastic about the results that he has already added the inhibitor to his

Sleek lines of modern styling are combined with the traditional richness and sturdiness of fine wood office furniture. This furniture was manufactured by the Indiana Desk Co. and is of American black walnut.

Designed by Charles U. Deaton, this Document Suite by the Leopold Co., is available in five harmonizing shades.

finishes. Others indicate they will follow suit.

Already a standard practice is chemical treatment which makes desk surfaces highly resistant to stains, scuffs and scars. Thus the uninhibited businessman may hoist his feet, spill his coffee, and otherwise abuse his furniture without fear of causing undue damage.

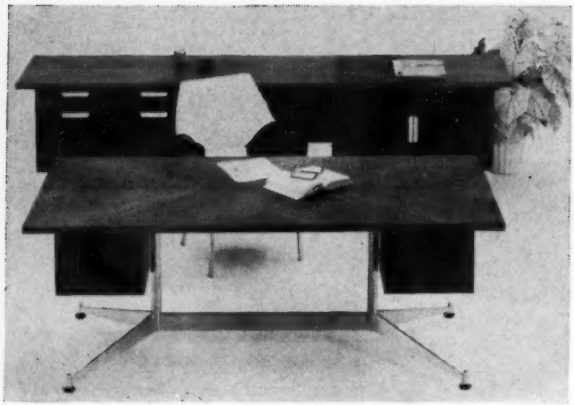
All this, of course, could amount to little if no consideration was given to the selling techniques of the dealer and the buying eccentricities of the consumer. In this area, WOFI is active with a combined advertising, merchandising, sales training, and public relations program.

WOFI's Certified Office Planning Service was inaugurated several years ago. Yet stories of sales harvests are still being received by our headquarters in Washington. A dramatic tale of COPS-inspired retailer success was told recently by Don Branham, of Branham's, Inc., Oklahoma City, Oklahoma. Branham reported that, after pondering the WOFI offer of COPS literature and sales aids for several months, he decided to give it a try.

"The result, measured by the ledger sheet," Branham says, "was that my sales jumped 25%, my expenses dropped 32%, and I reduced my personnel force by 40%.

"Customers were bowled over by my presentations," he continues. "They hadn't known such things existed. Three of them pleaded with us to lend them the model office center for figuring out new office layouts. You can imagine the good will which such interest engenders."

Branham also notes that the COPS program "revolutionized our policy of training salesmen."



Executive suite — desk is conference unit and credenza is wall unit. The credenza is 9' long and 2' deep. Desk, 7' long and 3' deep, has 6 shallow drawers. This Loring Group by Jasper Desk Co., is of African mahogany with exposed surfaces featuring diamond-matched veneer.

"In the past, it has been necessary to put a man on the floor for at least a year to learn the business—particularly to become conversant with the thousands of small items on sale. Then he was sent out to sell. It was several years before we could get back any of the $4,000 to $8,000 invested in the man.

"It literally took years and years before the company could make a profit on him. Naturally, it was difficult to hire college graduates or men with selling promise who would have to go out selling rubber bands and paper clips. Now that's all changed. We hire a better man today. He gets three weeks' training on our furniture lines and, within a month, is out soliciting business. Within two months, we can measure his progress."

Discussing cooperative advertising, Branham says that "we received six business inquiries from the first WOFI ad that had our name in a panel as a cooperating dealer. The result: Three jobs totaling $18,000."

Then he makes an observation which I will repeat without comment. Branham said the WOFI manufacturers "which conceived the COPS program, got $9,500 of the business . . . the non-cooperating manufacturers got the other $8,500 . . . it strikes me that someone's getting a free ride."

The industry trade association this year is sponsoring sales clinics in major cities throughout the nation for both COPS and non-COPS furniture dealers. Since the attitude of the dealer is one of the most important factors in the sale of our products, we know our money is well-spent in taking our show to the retailers.

We have confidence in the dealer's interest in wood office furniture. It was of more than passing interest to us that a national survey made by a metal furniture manufacturer disclosed that dealers prefer to sell wood, and that WOFI was given partial credit for that attitude.

This was no surprise to us. For a long time, we've had dealers tell us they prefer to sell wood for both practical and esthetic reasons. They get longer discounts on wood. And they prefer its inherent richness and beauty.

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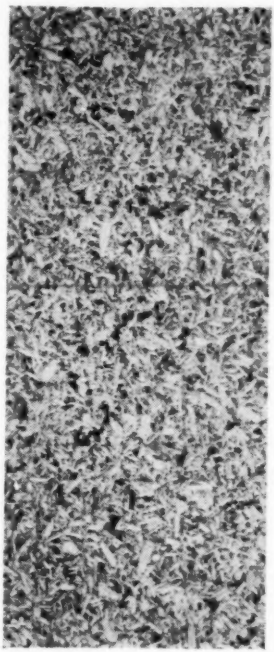

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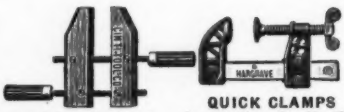

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ASK YOUR DISTRIBUTOR for a copy of the new Hargrave Catalog with selection-application information.

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Cincinnati 12, Ohio

HARGRAVE
The Complete Line of Tested
TOOLS

Robert Spelman holds aloft WOFI's three-dimensional scale model kit. By means of the kit, and other WOFI sales tools, salesmen may work out entire office modernization programs in prospects office.

There is an encouraging trend toward the use of natural materials of all kinds. In this industry, it can be felt and seen in recent events. For example, two large national insurance firms have junked all their office equipment and switched to wood for both executive and general office use. The insurance executives found their workers were more comfortable and worked better with wood office furniture.

There is a virtually inexhaustible market for wood office furniture today. It has been estimated that, if every piece of obsolete office furniture owned by American businessmen were junked overnight, it would take 25 years for every manufacturer in the nation to replace the equipment.

This illustrates the need for promotion of industry products. We do little for ourselves when we wait for customers to become aware of their needs without stimulation to buy. Thus our

public relations program, in addition to emphasizing the advantages of our products, is aimed at accelerating this awareness of the need for equipment replacement and office modernization.

It isn't enough to say that wood is good, or even that it's better than anything else. An indirect selling job is necessary. You have to sell the idea that there are monetary advantages in modernizing. We can produce figures, for example, that show a businessman can expect a production-efficiency boost of between 10% and 30% when he modernizes his offices.

This isn't to say that we're satisfied with what we're doing to reach and sell the market. We aren't. We must constantly expand this effort to meet competitive advertising; to reach all levels of business personnel—from the receptionist to the chairman of the board; we must reach some of the factors of growing influence in office planning—the architect and decorators; we must go after selected target categories of businesses and institutions, on a continuing, sustained basis.

When we succeed in reaching a few of these goals, I'll ask the WOOD WORKING DIGEST to let me write another story. Next time I'll make those rosy promises and optimistic predictions about the future. Meantime, we'll keep working.

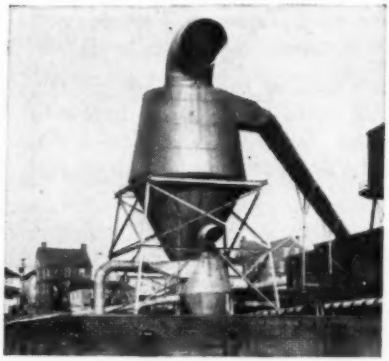
WOOD WORKING DIGEST

A Hitchcock Publication

Reaches the largest, influential audience at the lowest cost per reader. Send today for fact-filled folder and rates.

DIXIE takes the DUST out of INDUSTRY

Dust cuts profits; DIXIE controls dust . . . efficiently, safely and economically. If *your* woodworking plant suffers from dust-sabotage, consult a DIXIE engineer for expert direction, at no obligation.



Large cyclone collector is part of Dixie Installation at Red Lion Furniture Co., Red Lion, Pa.

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BE INFORMED ON WOOD GLUING

Interested in glues and gluing? If so, your name should be on the mailing list of THE PERKINS GLUE LINE. This house organ of Perkins Glue Company is mailed free of cost or obligation to all who request it.

Recent issues of THE GLUE LINE have carried articles on a wide variety of subjects including: Glue Selection, Glue Handling & Storage, High Frequency, Moisture Content Detection, Moisture Control, Hardwood Plywood Imports and similar topics.

Don't miss a single issue of THE GLUE LINE! Mail coupon below to Perkins Glue Co., Lansdale, Pa. today. Be informed on wood gluing!

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RIGHT OR WRONG

A roundup of day to day in-plant problems and how they were handled by management men. Each incident is taken from a true-life grievance which went to arbitration. Names of some principals involved have been changed for obvious reasons. Readers who want the source of any of these cases may write to WOOD WORKING DIGEST.

When can't you fire an employee for falsifying an employment application?

What Happened

As a routine measure, all employees hired by the company had their references and background checked. After Hilda D.—— was hired, the personnel department discovered that she had lied on her application form. She had claimed that she had more education than she actually did. And in two instances she had falsified the number of years of experience in previous jobs. She had also failed to mention that she had twice been fired from previous jobs. Hilda wasn't told of the findings and she worked on for about two years. During that time her work record was not too good, but not poor enough to warrant any discipline. She was just so-so.

One day Hilda received a letter from the Personnel Department advising her that she had been fired. The company claimed that the reason for firing her was her falsification of the employment application. The management pointed out that it long had a policy of discharging workers who had been guilty of such breaches, and it cited several instances where it had done just that. Hilda admitted that she had given wrong information on the application form but claimed that this was "standard procedure" among employees looking for work. She said that she was afraid she wouldn't be hired if

what's glue* got to do with the music she makes?

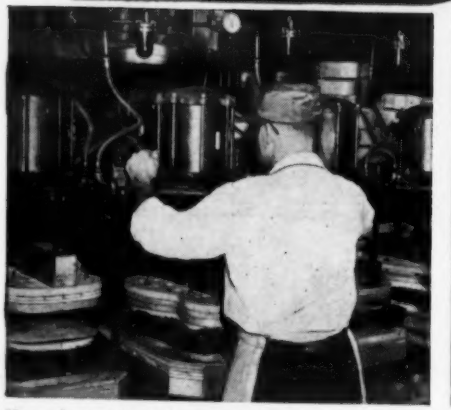
A manufacturer of fine musical instruments really appreciates the importance of glue to the life and performance of his product. Guitars, mandolins and ukuleles made by The Harmony Company, Chicago, are the finest by every standard. They represent six decades (more than 63 years) of ever increasing leadership in their field. Harmony has won this leadership by maintaining peerless standards of quality and workmanship... by alertness to modern production techniques... and tireless research to determine improved methods to make possible better musical instruments at popular prices.

Patented Glue Formula gives Harmony an Advantage

National Casein's patented FA 300 gap-filling, non-craze urea resin glue plays an important part in the manufacture of the Harmony Company's fine fretted instruments. Where close tolerances are to be glued and radiuses are to be considered on high frequency or resistance heating jobs, National Casein's FA 300 will mean the difference between a satisfactory bond and a

resin glue plays an important part in the manufacture of the Harmony Company's fine fretted instruments. Where close tolerances are to be glued and radiuses are to be considered on high frequency or resistance heating jobs, National Casein's FA 300 will mean the difference between a satisfactory bond and a reject — between purity of tone and distortion. Where joint strength and durability are requisites, under heavy stress or maximum vibration, as with stringed musical instruments, National Casein's FA 300 meets a very great need.

Write for Technical Data Folder FA 300. Address the National Casein office nearest you.



Here, by an ingenious combination of resistance heating, pneumatic pressure and the right glue, Harmony speeds guitar body assembly. Harmony reduces the body assembly cycle by hours.

One of Harmony's modern heat and pressure rib gluing assembly units. In the background, an antiquated hand assembly wheel.

Flanked by frames, tops and backs, another Harmony guitar body goes into an assembly press for FA 300 glue curing.

601 West 80th Street, Chicago 20, Illinois

Broad and Fulton Streets, Riverton, New Jersey

National Casein *

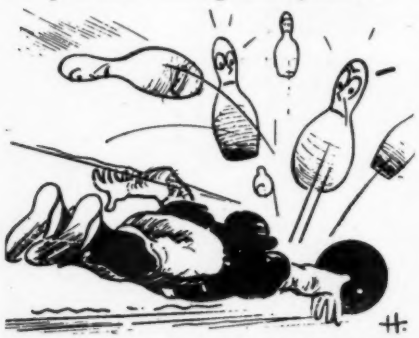
she told the truth. And then she pointed to her work record, claiming that she had performed satisfactorily enough to be kept on for two years, so after all, the misinformation on the employment record made little difference.

Was Hilda: Right ☐ Wrong ☐

What A Three-Man Arbitration Board Ruled

"While there were falsifications and omissions in Hilda's application for employment, they were minor in character and of a kind frequently and notoriously indulged in by employees in order to get work. Even so, by waiting two years, the company waived its right to take action on the charge of falsification.

"Furthermore the company knew of these indiscretions soon after hiring Hilda and if it chose not to exercise its prerogative of discharge within a reasonable time, it cannot use it later as a method for severing an employee from a job. It is our contention that the reasons given by the company for the discharge were not the real reasons. Hilda is to be reinstated with back pay less gross earnings or unemployment compensation during such period."



Must a worker get paid if through an "honest mistake" management skipped his turn to work overtime?

What Happened

As is the practice in many companies, this outfit had the policy of distributing overtime "fairly and equally." This meant that the senior man received first crack at the extra compensation. If he accepted, he then went to the bottom of the list until his turn came again. Roberto Di Vito came up to his supervisor one afternoon and asked if there would be any overtime available that night. It was his turn, he said, and he wanted to call his wife in case he would have to stay later to do the work. His foreman said he didn't know but would speak up once he checked to find out what the production schedule looked like. It turned out that there was overtime work available, but the foreman forgot all about Di Vito and assigned it to another man. When Di Vito discovered that he had been denied a chance to earn some extra money, he complained. He was told that he would be given a crack at overtime at the first opportunity.

The following week Di Vito was told that he could now get in some overtime work but he turned it down because he had a date to go bowling. In accordance with past practice the company put him on the bottom of the list to wait his turn. Di Vito filed a formal grievance this time. He said that the company had skipped his turn and should now make good by paying him even though he did not work. The company balked. It said that it had made an honest mistake and tried to rectify it by offering overtime a week later. The fact that he didn't accept it and preferred to go bowling was his hard luck, and the company did not feel further responsibility.

Was Di Vito Right ☐ Wrong ☐

What Arbitrator Benjamin M. Selekman Ruled

"Applying the rule of reason and the fact that major responsibility for administration of a business devolves upon management, I must hold that the company is responsible for the loss of Di Vito's overtime. There is no question as to the good faith of the foreman—we are all apt, under the pressures of daily work, to be forgetful. Nevertheless Di Vito has rights under customary practice. Since the company is the responsible administrator it must pay for its mistakes however understandable such mistakes may be. The grievance is granted. Di Vito is to be compensated in the amount he would have earned had he been given overtime the night he was entitled to it."

Can a senior worker exercise his seniority right to transfer to another job in the same classification?

What Happened

Bob Herman and Ed Garaway worked near each other. Both were on jobs which had the same labor grade, though the duties and responsibilities differed somewhat. Bob took sick and had to quit. This left a vacancy open for his job. The supervisor, as was common practice in this department, posted a notice and asked workers to bid for the job. Usually the senior employee was given preference provided he had the skill and experience to qualify. Garaway put in his bid for the opening on the grounds that he was senior man in the department and knew the operation well. His supervisor refused to make the transfer. He claimed that Garaway was already in the same classification as the opening and that a man cannot demand a transfer to a job which pays about the same rate and is not a promotion. If this were possible, the foreman claimed, it would upset the routines in the company. The reason they have "bidding for jobs" is to give a lower-rated man a chance to climb up the ladder.

Garaway said "no soap." He argued that the vacant job had many advantages he didn't enjoy although he was in the same labor grade. For one, the job usually had more overtime. Two, it was cleaner work and three, the incentive earnings were slightly better. "If you promote a junior man into that vacancy," Garaway held, "you are giving him an advantage over me" (which is a violation of the seniority principle). "If you want to promote a junior man, give him my job and I'll take the one left open by my friend Bob."

Was Garaway: Right ☐ Wrong ☐

What Arbitrator B. Meredith Reid Ruled

"Promotions were never intended to mean that an employee can select a machine or pick a job in situations where such related tasks pay the same rates. Management has the sole right to make transfers as a necessary element in the operation of its business. Upgrading connotes an upward movement to a higher classification requiring superior skill or more work, and entails higher pay. The opening left by Bob Herman's quitting had none of these so Garaway is not entitled to exercise his seniority. Grievance denied."

Sometimes when a man thinks his mind is getting broader, it is just his conscience stretching.

A.S.M.E. and F.P.R.S.

Hold Meetings in Chicago

November 13-17, 1955

The American Society of Mechanical Engineers holds its diamond jubilee annual meeting in Chicago on November 13-18. The program for Monday, November 14, will be particularly interesting to our readers. The Wood Industries section program follows:

2:30 p.m. Panel Discussion
Methods Currently Used for Manufacturing Wood Particle Board
Moderator: A. J. Hall, U. S. Forest Products Lab.
Panel Members:
Dawson Zaug, Dixie Chipboard Co.
John M. Crafton, Chipcraft Co.
Don Collins, Adamson United Co.
Roy Sides, Miller-Hofft Inc.
George I. Fischer, U.S. Plywood Corp.
Arthur Mottet, Long-Bell Lumber Co.

6:00 p.m.—Wood Industries Dinner
Speaker: A. K. Lahti, Assoc. Prof. of Design, College of Architecture and Design, University of Michigan, Ann Arbor, Mich.
Subject: Design and New Materials

8:00 p.m.—Wood Industries
Machinery Used in the Manufacture of Wood Shaving Boards in Germany
Wood Particle Board—A Contemporary Material

F.P.R.S. Plans Program

In the three days following the A.S.M.E. meeting, the Forest Products Research Society has set up a 5-star program. Three sections—Midwest, Great Lakes and Upper Mississippi Valley—have combined to present the following program at the Blackstone Hotel, Chicago.

COMPOSITION BOARD IN FURNITURE AND MILLWORK

Tuesday, Nov. 15, 9 a.m.

Chairman: Wayne C. Lewis, U.S. Forest Products Laboratory, chairman, Midwest Section, F.P.R.S.
Chipboard - Particle Board . . . now that we have them, what do we do with them? How can we make most profitable use of them in combination with other materials? Based on their own current operations, let these experts tell you how they're doing it:
BRAMCO, INC., New York, N.Y.—L. R. Louis, vice-president.
LANE CO., Altavista, Va.—Representative to be selected.
JASPER-AMERICAN CO., Henderson, Ky.—Arnold Habig, president.
WABASH SCREEN DOOR CO., Minneapolis, Minn.—L. A. Patronsky.

EFFICIENCY IN MATERIAL USAGE IN FURNITURE MANUFACTURE

PANEL SESSION—Tuesday, Nov. 15, 2 p.m.

Chairman: Stephen B. Preston, University of Michigan, chairman, Great Lakes Section, F.P.R.S.

How can you attain a higher efficiency in usage of materials—in Lumber Recovery—in Veneer Usage—in the Finishing Room? Come and hear the answers from this panel of furniture plant managers who have improved the efficiency of their operations:

Program—"Efficient Utilization of Materials In Furniture Manufacture."

THE STANFORD REPORT ON FUTURE DEMAND FOR FOREST PRODUCTS

What does it mean to your business? Does it mean more or less lumber consumption in the next 20 years? How will millwork fare? Will more or less plywood be used? What's the outlook for hardboard? Will the furniture industry meet the demand for double today's output?

PANEL SESSION—Wednesday, Nov. 16, 9 a.m.

Moderator: Dr. Frank Kaufert, University of Minnesota, F.P.R.S. National vice-president.

Lumber—speaker to be announced.

Plywood—William E. Hunt, vice-president, sales, U.S. Plywood Corp. N.Y.

Hardboard—Paul B. Shoemaker, vice-president, sales, Masonite Corp., Chicago

Furniture—Joseph Griswold, Jr., president, Widdicomb Co., Grand Rapids, Mich.

Millwork—Earl C. Swanson, vice-president, Anderson Co., Bayport, Minn.

WHAT'S AHEAD IN WOOD BY- PRODUCTS?

Thursday, Nov. 17, 9 a.m.

Chairman: Fred Loveland, Upper Mississippi Valley Section, F.P.R.S.

Some believe a whole new chemical industry will grow out of the salvage of mill residues. What does this mean to your business? Hear what Francis G. Snyder, and other chemical utilization specialists foresee in this important field.

Residue Utilization—Francis G. Snyder, F. G. Snyder Associates, Brookfield, Conn.

HARDWOOD PLYWOOD — TODAY AND TOMORROW

Thursday, Nov. 17, 9 a.m.

Chairman: Dr. Herbert O. Fleischer, U.S. Forest Products Laboratory, Chairman, F.P.R.S. Veneer and Plywood Subject Matter Committee.

What new developments will influence future use of fine hardwoods for furniture, cabinets, millwork, paneling? Hear the views of Dr. Fleischer and the speakers he has lined up for this session:

EFFICIENCY IN THE PRODUCTION OF VENEER AND PLYWOOD

"Some Relations of Wood Structure to the Smoothness of Knife-Cut Veneers," by John Lutz, technologist, U.S. Forest Products Laboratory, Madison, Wis.

"Practical Aspects of Veneer Drying," by Arthur Holden, engineer, Coe Mfg. Co. Painesville, Ohio.

"What's New in Gluing Techniques," a Panel of authorities headed by moderator Ralph Casselman, Paine Lumber Co., Oshkosh, Wis.

This is a splendid program. We urge every member—and those who should be members—to attend these meetings if at all possible.

Add Sales Appeal

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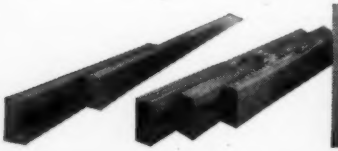

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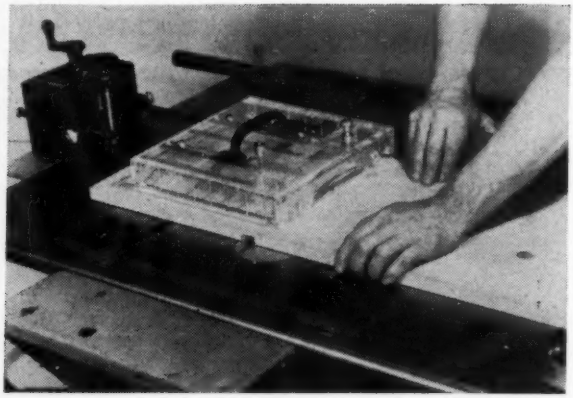
SAFETY GUARD AND GUIDE



One answer to the mechanical and psychological problems of guarding a circular saw is the new safety guard developed by Frank Bretthauer, an instructor at Chelsea Vocational High School in New York City. It is a challenging approach because it takes advantage of one of the weaknesses in the use of former metal hoods: it makes the guard so easy to move that the operator is encouraged rather than discouraged to change it from one position to another. He gets into the habit of using it because it guards and assists him on all table saw operations.

Basically, the new guard seeks to accomplish three things: (1) To be suitable for practically all operations on a circular table saw; (2) To be easy to install and use; and, (3) To permit the operator actually to view the sawing operation. These goals are in addition, of course, to the traditional safety features of preventing contact with the blade and of shielding the operator from flying splinters and broken saw teeth. It has already been approved by state industrial approval boards.

The new guard protects the operator not only in such operations as ripping, plowing, short crosscutting, long crosscutting and mitering, but also in work that has been difficult or virtually impossible to guard, such as plowing, rabbeting, tenoning, drop sawing, diagonal sawing, tonguing, template cutting and feathering. This versatility is made possible because this unique guard is designed for use in three different positions on the table and can be easily changed from one position to another. Materials which combine strength with lightness in weight are used in place of

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E-30 OSCILLATING EDGE SANDER WITH TILTING TABLE

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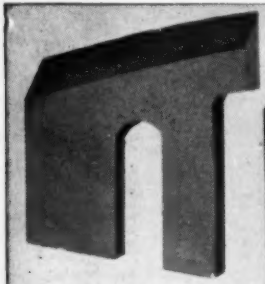
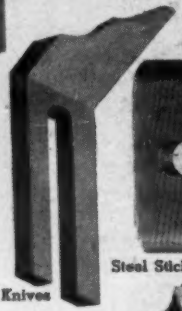
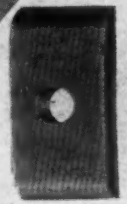
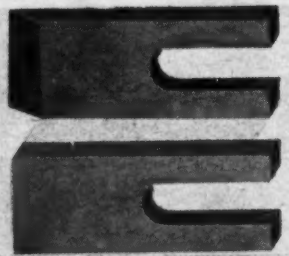
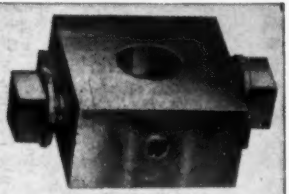

Tenoning Knives


Coping Knives


Steel Sticker Caps


Carbon Steel Blanks for Moulding Knives

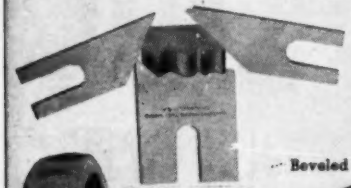
Mitre and Rabbet Blanks


Cope Heads

Shuff Sticker Saw Head for Use on Moulders

Planing Machine Knives

High Speed Knives


Beveled Edge Shaper Knives

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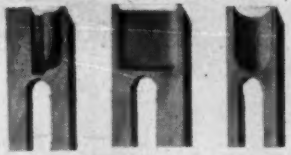
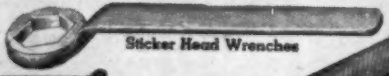
Moulding Knives

Palm Screw

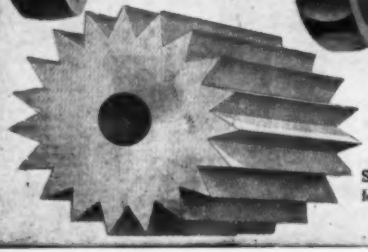
Palm Nut


Milled Knives


Sticker Head Wrenches

Sticker Springs

Sticker Posts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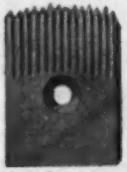
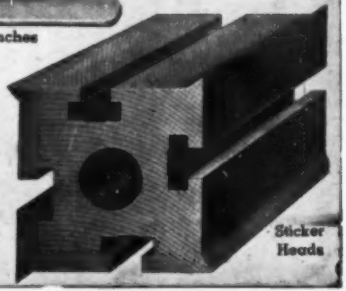

Spurs


Sticker Heads

the heavy metal that made former hoods cumbersome to remove and replace.

The shielding guard itself is shaped like a shallow box over the saw and is made of ½ inch thick transparent plastic such as is used in aircraft construction. This clear plastic hood allows full visibility of the work at all times. Instead of being attached directly behind the saw, it is held in place over the saw blade by means of two steel rods that extend out from an adjustable mounting base at the edge of the table. As noted previously, this cast aluminum base can be positioned on three sides of the table and is held in place by two lugs and a threaded spindle that are inserted in three holes drilled in the table. If the operator wishes to adjust the shield, the base does not have to be removed.

The plastic shield and its supporting rods can be adjusted horizontally from the mounting base or vertically from the table. It can be locked rigidly in place over the saw so that it clears the stock or it can be adjusted to exert either sidewise or downward pressure on the stock. This latter feature helps hold the stock in place during some types of operations and helps prevent kickback of the material. As a further antidote for kickback, the plastic shield has a kickback plate with an adjusting pin to regulate the height of the bottom dogs. If a stop pin is needed for cutting pieces to the same length, an 8d nail can be inserted in one of the several holes along each side of the plastic hood.

The whole guard has been designed to hold the shield rigidly in place. If jammed stock, a broken saw or some other excessive upward pressure should be made against the hood, the force of the pressure might damage the guard. As a safety device, therefore, a brass bushing on the height-adjusting spindle provides relief against excessive pressure.

Information about the guard and guide is available from the Brett-Guard Co., 5 W. Sheffield Ave., Englewood, N. J.

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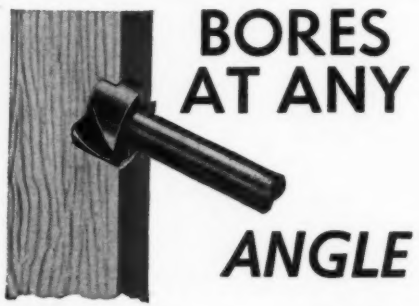

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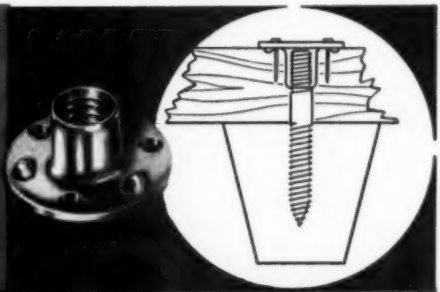
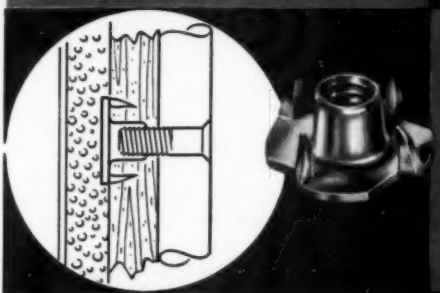
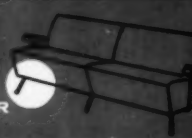
Can be held in place by brads until final attachment of components by dealer or consumer. Short prongs prevent turning when hanger bolt is tightened.





LONG PRONG TEENUT

Prongs are curved for twisting action as Teenut is driven, provide extra holding power in wood. Chair back or seat are easily assembled or disassembled.



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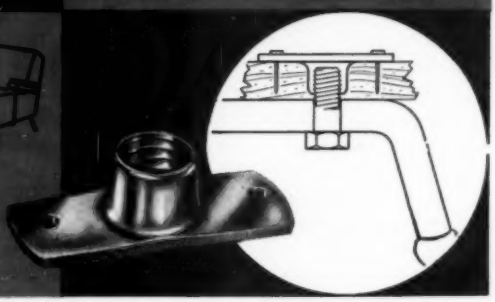

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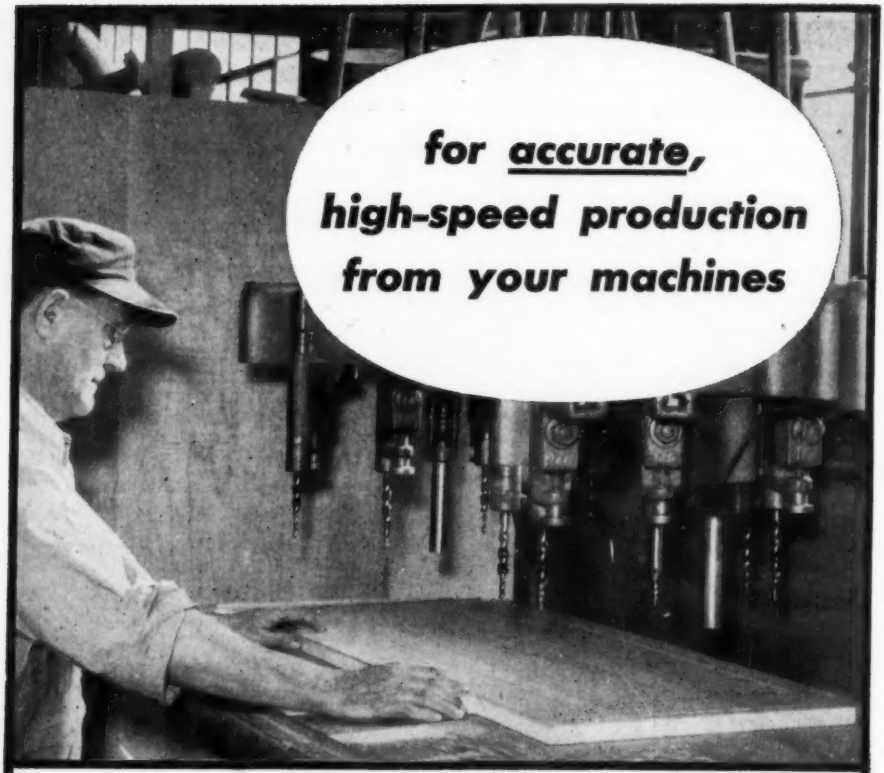

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Let's Make Safety Work

By Jack Bedford

A REVIEW of the safety record of any woodworking plant will reveal that the accident rate goes down during a safety training program. It is held down immediately following this type of program. Then, suddenly accidents will start to happen all over the plant. The accident rate will then be as high or higher than it was before the woodworking plant put its safety program into effect.

Why?

Usually it is because the newness of the safety program has worn off around the woodworking plant. Workers and supervisors have fallen back into their old habits . . . they neglect to keep practicing the safety rules covered in the initial safety training program.

When the accident rate starts to climb, woodworking plant management is likely to consider the safety program a waste of time and money and cast it aside. This may pare a few dollars from the evident overhead expense, but the hidden cost of accidents will remain—lost time, lower production machinery repairs, and lower employee morale.

Progressive management does not stop the sales promotion and advertising program when business starts to decline. They put more effort into promotion. This may include more aggressive selling, sales contests, more extensive advertising, or selecting a new theme or slogan for the advertising.

Whatever is done, it is promotion—not stopping!

Safety programs need a "shot in the arm" to keep them at top efficiency and to keep the accident rate at a low level. Here are some ideas you may find helpful in promoting safety in your woodworking plant:

1. BULLETIN BOARDS

Safety posters can be purchased in quantity for use on your bulletin boards. However, this type of poster usually falls into a standard pattern. A check with the employees the day after the poster has been changed will not reveal much identification or interest. Workers form a habit of tuning out the standard safety poster just as they have learned to tune out radio and TV commercials.

Part of the reason for this lack of interest in the prepared safety posters is that they lack woodworking plant interest. The people pictured on the poster are not known to your employees. The scenes illustrated may be for an accident in a steel mill or a tire

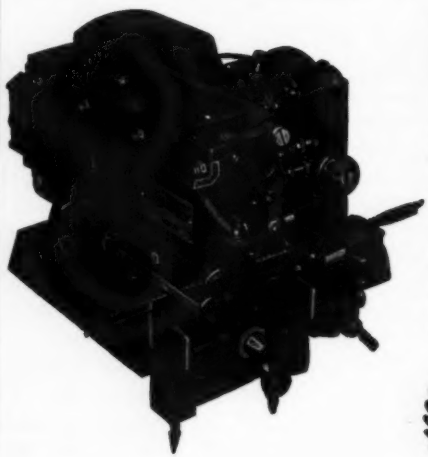
plant and lack woodworking industry identification necessary for arousing the interest of the workers in your plant.

However, when this poster idea is changed to a poster of an accident in your plant, a photograph of one of your men who has an enviable safety record, or a picture of some new safety attachments you have purchased, the workers will read and remember the safety poster. This will have human interest for your plant.

Here are some specific suggestions to help you make your posters more successful:

1. Change the posters frequently—at least every two weeks.
2. Picture current accidents — not ancient history.
3. Have the poster tell the story—who, what, why, and how it could have been presented.

The Amazing Wardwell "K5"



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Saw is firmly locked by solid steel cam when being filed and set. Absolute uniformity assured.

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These manufacturers know that Woodlife quality is underwritten by over 30 years of continuing research in the most active chemical and testing laboratories in the water repellency field.

If you have pride in *your* products and don't know about Woodlife—*you should!* Protection Products engineers will be glad to work with you to develop the most economical Woodlife treatment method for your specific application. Send for the informative folder, "WOOD PRESERVATION WITH WOODLIFE".

WRITE

Protection Products
MANUFACTURING COMPANY
Since 1921
Dept. X, Kalamazoo, Michigan

4. Keep copy on safety posters at a minimum—people do not have or take time to read a long message.

2. PERSONAL LETTERS

Every time the safety records of employees are reviewed, it is suggested that the safe workers receive some kind of a personal letter from a top executive in the plant. This can be a short note of congratulations to each employee who has gone through the period—six months or a year—without an accident.

These letters can follow a form yet be made personal by a review of each individual's long standing safety record. If the employee received a safety letter a year ago, for instance, the second letter might start something like this:

"Last year when I wrote you about your fine safety record, I sincerely prayed that I would be able to send you another letter this year. You have gone two years without an accident! Congratulations, John."

Woodworking plants with a limited number of employees may find this form of stimulation is best when the letter is delivered to the home of the safety-minded worker. It helps the family realize how important safety is considered at the plant.

You may want a more frequent system of writing to new employees. Statistics prove that new workers are more likely to have accidents than older workers. Thus, new employees will receive a letter when they start, after a month, three months, six months, nine months, and one year. After this time the new worker is placed on the regular roles of safe workers.

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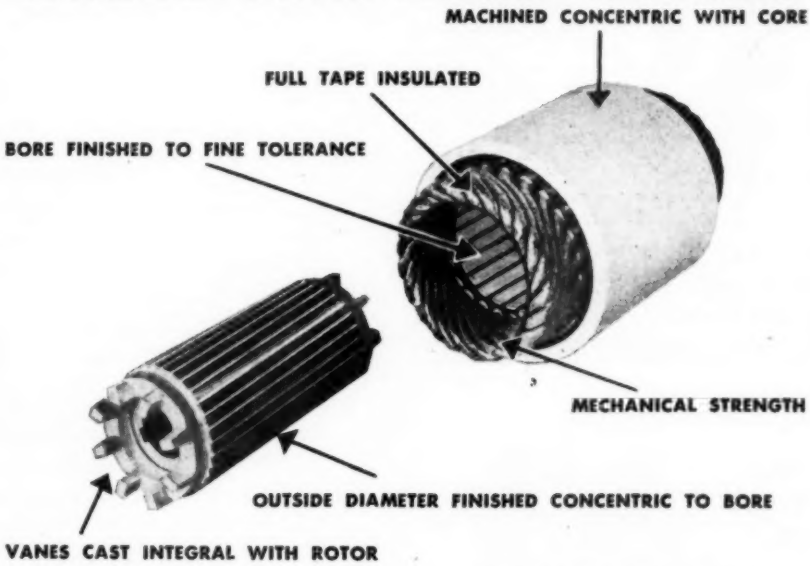
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The application of direct motor drive with WOODS' Shaftless Motors to high-speed spindles brings the peak of motive efficiency at relatively small cost. Conserves space—eliminates belts and gears—fewer wearing parts. The extensive and varied lines of WOODS' Shaftless Motors are available for nearly every class of direct application.

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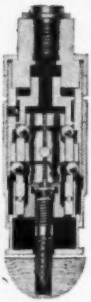
NEW TITAN High Speed Hanger Bolt Driver



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This tool is used by a majority of plants where hanger bolt driving is done on a high production basis. Can be operated at any speed which is safe for driving the hanger bolt. It is not necessary to stop rotation at any time.

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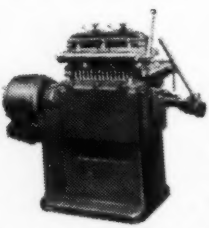

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Under this plan, employees who have had a serious time lost accident receive letters of congratulations when they return to work, after a month, and again after three months. It is not because these workers need a reminder, but they will talk safety at lunch, be more observant of other workers' unsafe practices, and be good on-the-job safety trainers for new employees.

Another plan for these letters is to send one to the men in one department and another to those in another department. Thus, everyone is congratulated and this starts a form of rivalry between the workers to establish the best safety record for their department.

When you adopt the plan of using personal safety letters, you will want to consider these suggestions:

1. Don't use a mimeographed letter —make it personal or don't send it.
2. Tie-in with past safety letters to make the congratulations more personal and more sincere.
3. Work out a system so that none of the employees is overlooked in this safety letter program.

3. CONTESTS AND DRAWINGS

Safety contests have been used in many woodworking plants with a variety of results. If the contest is successful in keeping the accident rate at zero for any period of time, the contest drags on for months. Employees tend to lose interest after a month and the value of the safety contest is lost.

However, if the accident rate is particularly high, the contest can be used for a short time to provide a stimulant to get things back to normal. Then, after the contest has run for 30 days the awards can be made. This will

eliminate the long drawn out waiting and the lack of interest that may develop.

Another form of contest that you may find successful is the weekly safety drawing. Management puts up a weekly safety award depending on the number of employees and the seriousness of the accident rate. Each week the workers who have had 60-accident-free working days are entered in the drawing.

After a worker has had an accident, he must maintain a 60-day safety record before he can participate in the weekly drawing. This keeps everyone safety conscious and ties in with the payroll pools that have developed recently.

A variation of this weekly drawing is to eliminate all workers when there is an accident in the department. Thus, everyone in the department suffers if there is an accident. Safety soon becomes a topic of conversation, observation and activity all the time.

Best results are obtained when the contests and the drawings follow these suggestions:

1. Keep the time limit of the contest under 30 days and drawings on a weekly basis.
2. Make the rewards worthwhile to build a greater worker enthusiasm.
3. Post contest results or names of drawing winners as soon as possible.
4. Emphasize safety in all activities connected with the contest or drawing.

These three methods of promoting safety are by no means the complete list . . . they represent ideas that you may find helpful.

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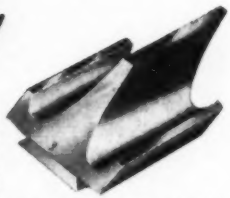

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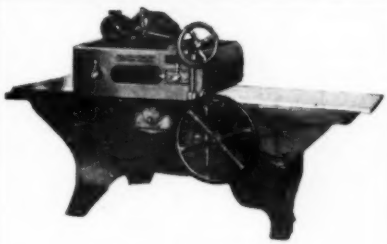

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Evolution of LUMBER DRYING TECHNIQUES and DRY KILNS

By Paul H. Graham

IN their current stage of development modern dry kilns are arranged for both cross loading and end loading, with the lumber extending sidewise with ends toward the walls in the cross loading kiln and endwise in the end loading kiln. In general application of these kiln loading types, the cross loading kiln is usually designed for longitudinal circulation and the end loading kiln for cross circulation.

This is based upon the theory that lumber will dry best when arranged so that air will be allowed to pass through the pile with the least amount of friction and provide the best uniformity of heat. Cross piling is said to tend to aid longitudinal circulation, end piling to help cross circulation.

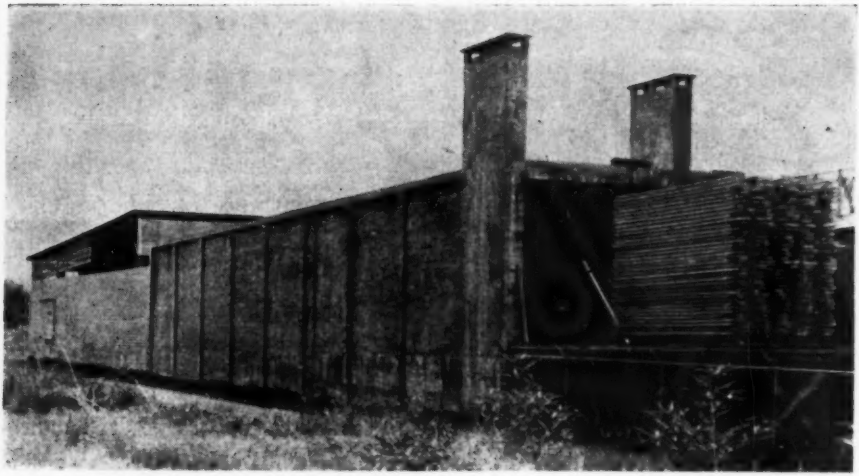
Since most of the early kilns were loaded manually, they were essentially of the cross loading variety, with the possible exception of progressive kilns. The requirement of cross loading was eliminated by the introduction of kiln trucks and the use of a kiln trackage system. Progressive kilns were provided with tracks by all manufacturers to facilitate rapid movement of lumber through the kiln on kiln trucks or bunks.

Even after tracks were in general use and large compartment kilns were provided with tracks, many small kilns still had no such provision and lumber in them continued to be piled on ties, timbers, horses and similar forms of support. Later commercial small kiln designs provided trackage systems similar to those of larger kilns.

End piling seems to have produced best results with the advent of the internal fan kiln, regardless of whether the fans were located above or below the kiln load. It also appears from reports of that era that lumber piled lengthwise on kiln trucks provided greater kiln capacity as loads could be shoved almost tight end to end, with only about a 12" clearance being required at each end.

Reports of short-length natural-circulation dry kilns of that period, holding one or two kiln trucks only, indicate that there was little to choose between the two loading types, as performance was reported to be equally good.

Modern forced-circulation dry kiln designs and piling methods have now been developed to a point where end loading and cross loading kilns now have their own particular advantages for specific applications and many of



Early two-door end-piling track kiln acted as drying tunnel for lumber, loaded at one end wet and removed from other end dry for delivery to dry storage.

the past troubles reported have been remedied and even eliminated.

As with any new trend which consistently reports good results, the trend toward end loading kiln design caused many cross loading, natural circulation kilns to be immediately converted to end loading arrangement or converted for forced air circulation by directing circulation lengthwise of the kiln and against the stickers.

In the first type of conversion the kiln modification which involved rearrangement of kiln equipment to conform to accepted end loading design proved to be very expensive and frequently proved impossible without rebuilding the entire kiln. In the latter application considerable trouble was experienced in trying to produce adequate circulation with air directed against the stickers.

Later kiln conversions seem to have solved the circulation problem by providing fans of higher horse power to force air through the load parallel to the lumber and against the stickers. While baffling aided to some extent, it was learned after considerable study and experimentation that more power was required to do this than to move air parallel to the stickers.

This investigation indicated that requirements of dry kiln chamber size for the two methods of loading differed somewhat with different dry kiln manufacturers' information but approximated the following:

In end loading compartment and progressive kilns the width and height of loaded kiln trucks determines the width and height of the kiln chamber, with the usually accepted allowance providing about 18″ between the loads and walls, and about 24″ between loads at centers.

In cross loading kilns an allowance of 6″ to 12″ is usually provided between the loads, and 18″ to 24″ be-

Triple-track Moore Cross-Circulation Kiln
at Marsh Lumber Co., Dover, Ohio, drying
oak flooring stock. Note Moore Bobtrailer

Manual transfer car mounting car puller in position to service Moore triple-track side-loading kiln.

tween end loads and doors and/or end walls.

Piling requirements also differed somewhat but these differences will be taken up later in another section devoted to piling of lumber for kiln drying.

In early kiln trackage systems, tracks were installed by mounting them on railroad ties or timbers laid on the kiln floor, or imbedded in a natural dirt or cinder foundation where kiln floors were not provided. Maintenance costs were high and ties or timbers had very short service life even when treated with a preservative solution, which often lost its protective properties under repeated and constant exposure to heat and moisture changes. Where tracks did not have a solid bed mounting, sunken tracks frequently caused lumber loads to be overturned. Loading and unloading the kiln was generally difficult and sometimes a dangerous operation.

With the introduction of the internal fan kiln and requirement of locating coils and fans beneath the trackage system, it became common practice to install kiln tracks from 4′ to 6′ above the ground level to eliminate costly excavation. Although some tracks were still mounted on ties supported by a wooden bridge trestle type of mounting, progressive dry kiln manufacturers recommended the advantages of more permanent types of track mountings and supports.

In some installations steel I-beams were placed across the kiln wall foundation with proper clearance provided and placed at proper intervals to hold up the rails. These I-beams were punched to permit inserting of bolts to hold the rail in place. In others, tracks, steam coils and fan mountings were frequently supported by the same base framework.

The trackage system in many dry kilns was and still is supported on concrete piers, with the rails held rigidly to bed plates with steel clips

Swing-type turntable used to change direction of travel or to do away with curves. Permits servicing both tracks of kilns or delivery to other tracks.

Courtesy Crosby & Siegars, Inc.

fastened with anchor bolts embedded in concrete. Steel track foundation also quite popular is made up of a series of tubular steel posts, with wide-flanged bases, and a metal framework tied together with heavy braces running horizontally.

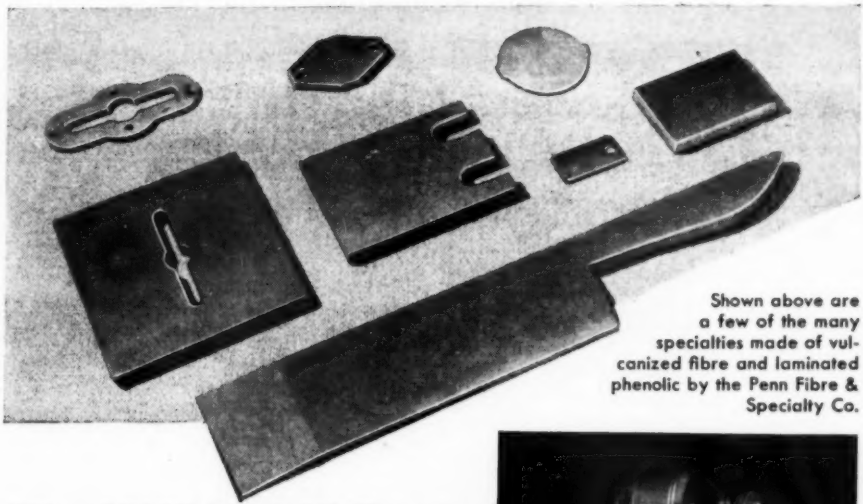
The trackage system was installed only inside the kiln at first, requiring the kiln to be kept out of operation for the length of time needed to unload and reload the kiln. It was required to bring lumber to the kiln and load it manually onto kiln trucks inside the kiln.

One of the developments arising from this problem was the adoption of two-door kilns, one at each end, with short lengths of loading tracks running to the kiln and unloading tracks running from it. Thus, it became possible to run kiln trucks of dried lumber out of the kiln for unloading and run loaded trucks into the kiln for drying, while another kiln charge was being built up on the loading tracks.

In cross loading kilns the lumber entered the kiln sideways, carried on kiln trucks mounted on three rails. In end loading kilns the lumber entered the kiln endwise, with trucks running on two rails, usually with two lines of tracks provided for each kiln chamber. As with a progressive kiln, the compartment kiln acted as a tunnel, with lumber being loaded at one end wet and removed from the other end dry.

There is no doubt but what this feature provided better piling and greater holding capacity to reduce the time required to unload the kiln and recharge it. It did require, however, tight, well insulated doors for both ends of the kiln and presented a greater area for possible kiln leakage.

The constant maintenance problem made kiln owners more receptive to the more flexible transfer track system which not only provided better service and capacity for loading and unloading the kiln but in addition permitted incoming lumber to be stacked and stored on kiln trucks and be unloaded after drying at the cut-off saws with only a single handling. This system was reported to have eliminated as many as six different



Shown above are a few of the many specialties made of vulcanized fibre and laminated phenolic by the Penn Fibre & Specialty Co.

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In manufacturing their products, Penn Fibre & Specialty Co. is constantly cutting vulcanized fibre and Bakelite. Says Mr. Davis—"vulcanized fibre is hard on saws, which require frequent sharpening and setting. We find a Foley Saw Filer in our own plant is more convenient, saves 'down-time', cuts our saw sharpening costs and enables us to own fewer saws. Anyone can learn to use the Filer. We have realized savings of $20 to $30 a month since installing the Foley Saw Filer."

FOLEY SAW FILER OPERATING DATA

Materials cut	Vulcanized Fibre, Bakelite in thicknesses from 5/1000" to 1½"
Foley Saw Filer used for	2 years
Average weekly use	4 hours
Number of operators	Two
Previous experience	None
Saws filed	about 4 dozen band saws ⅜" to 1" wide, 18' long 6 circular saws 10" to 12" diam.
Previous saw filing method	Custom filing by outside shop

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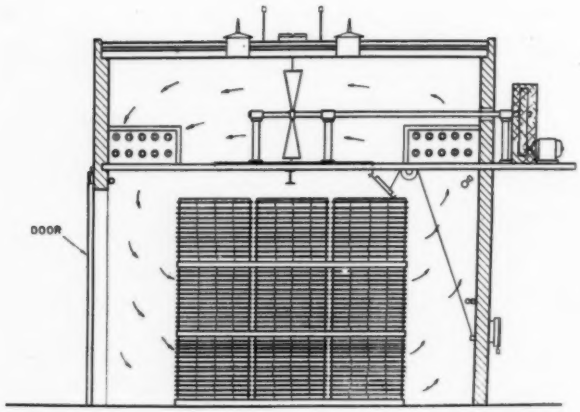


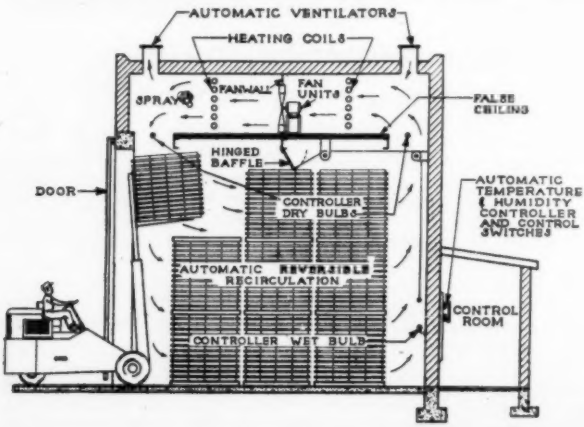
Sketch of Moore side-loading cross-circulation kiln.

handlings in many cases.

Before the introduction of the transfer track system, dry lumber had to be unloaded immediately or shortly after removal from this kiln. This system allowed a backlog of lumber to be maintained on kiln trucks in sufficient quantity to load the kiln immediately after dried lumber had been removed and further provided a backlog of dry lumber in storage ahead of machining operations without taking up valuable plant production floor space.

Movement of kiln trucks over the various kiln track systems was primarily a manual operation. Where two-door kilns were used, it was common practice to install the kiln tracks with a slight downgrade, from front to back, to permit the kiln trucks to be moved more easily by man-power.

Movement of kiln trucks over modern transfer track systems is performed manually, by winch, car puller or transfer car. Transfer cars may be manually-operated or powered by electric or gasoline motor, and usually mount some form of winch or car puller which is



Sketch of Standard side-loading trackless package loaded kiln.

On 5-ply birch-veneer desk tops...

Carbide shaper knives double production rate

Carboloy Grade 883 carbide trims 5/8" radius on 3,000 desk tops before regrinding; steel cutters dulled after only 200 pieces. Carbide cutters are sharpened only at beginning of day; steel cutters had to be changed 5-6 times daily.

Tough 5-ply birch-veneer desk tops caused production headaches at American Seating Co., Grand Rapids, Michigan, because they dulled steel cutters after only 200 pieces. This meant changing knives on the Onsrud automatic shaper 5-6 times a day. Grinding costs were high; scrap was piling up.

But when Carboloy® Grade 883 carbide was substituted for steel, production rate doubled, daily downtime was eliminated, scrap rate was reduced to almost nothing.

The reason: Carbides outlast steel up to 50 times on even the toughest jobs. Glued multiple plywoods, laminates, gummy or spongy mineral-streaked woods are perfectly machined without tearouts or "ironed" surfaces.

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operated by a power take-off from the car propulsion power course.

Most transfer track systems usually require some form of switching device, such as a turntable, which is mounted on a rigid framework of steel, moving on roller-bearing wheels for easy motion. Some turntables are designed to rotate on a ball-thrust type of pivot bearing.

Where a swing table is required to change direction of travel or to do away with curves, this type of table differs from the turntable in that it is pivoted in a corner, instead of the center, to provide more leverage for turning work. The swing table may be moved through an angle up to 180 degrees, with the table pivoted on a radial thrust bearing and other corners riding on roller-bearing wheels.

Various transfer track systems were reported in just about every arrangement imaginable. A typical system reported the use of some 3500 feet of track in parallel arrangement to provide green storage for about 275,000 board feet of lumber and dry storage for about 72,000 feet of dry lumber, divided by two transfer tracks, to service dry kilns and the plant. Using a by-pass track and turntables, a single transfer car handles all kiln truck movements. It is equipped with a winch and its cable operates in either of two directions by running the cable through combinations of pulleys and reaches the length of the storage area. Handling includes unloading and stacking incoming lumber, moving to green storage, moving in and out of the kilns, and moving into and out of dry storage for delivery to the plant. Storage tracks meet the transfer track at right angles which continues beyond the transfer area to the dry kiln and on to the dry storage area and the plant.

Loading tracks at the front of the two kilns hold six 16′ trucks each. The green storage area accommodates 46 trucks holding about 275,000 board feet of lumber, the dry storage track area has a 12-truck capacity, or about 72,000 board feet of lumber.

Actual switching, loading and transferring time with the transfer car is said to be not more than 3 hours per day to handle a volume of lumber which formerly required an 8 man crew without the transfer system a full 8 hour day or more.

There is a current trend away from track systems with the growing use of mechanized lumber handling equipment, such as lift trucks and straddle carriers. Trackless kilns have been designed which are especially adapted to small or medium size plants as well as for larger plant operations where mechanized lumber handling methods are used.

Trackless dry kilns were designed previous to World War II but began to grow popular after this time, influenced by the period trend toward increased use of lift trucks. The most popular type of trackless kiln has been the side-loading cross-circulating kiln designed for full-length lumber. Furniture plants which purchase considerable quantities of dimension stock have found an end-loading type of trackless kiln very satisfactory.

The trackless dry kiln provides an unobstructed drying area which allows ample room for lift truck operations. Use of the lift truck eliminates need for

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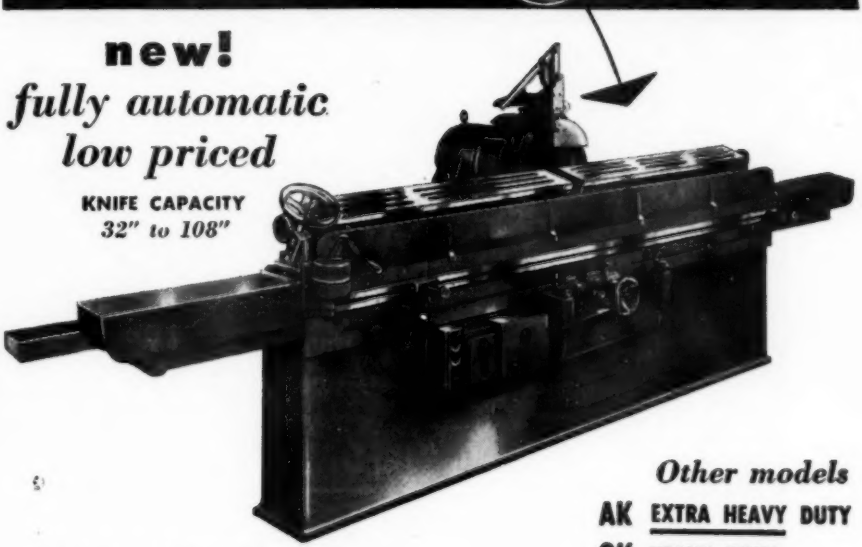

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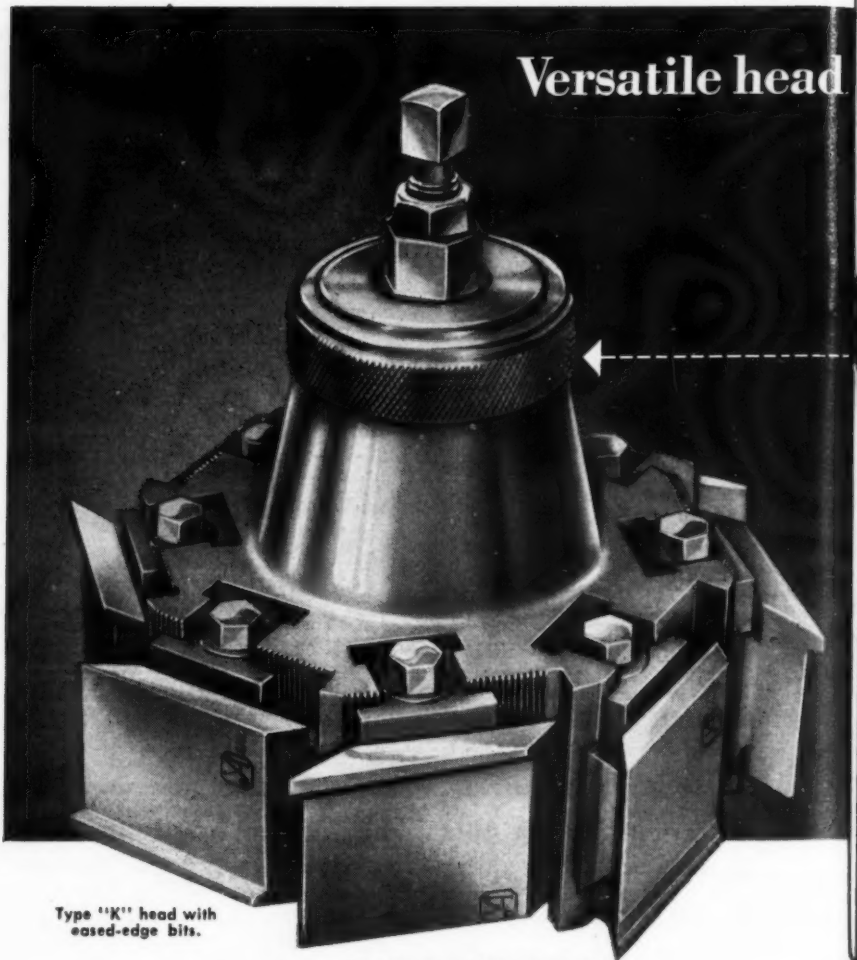

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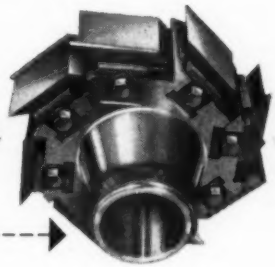

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HK-2

transfer tracks or doors at each end of the kiln. Handling of lumber is reduced as it only has to be stacked once into unit packages which then may be moved directly from the green storage yard to the dry kiln and when dry, be removed in the same packages to either the dry storage area or plant.

To service the trackless kiln, the lift truck stacks the unit packages of lumber one on top of another with bolsters or cross ties between the packages. Kiln piles will vary from as few as two unit packages for a small end-loading kiln to four or six for the larger side-loading kiln. Kiln doors are larger than those of conventional dry kilns, many large enough to permit large lift trucks with a full load of lumber to enter. When drying of the lumber is complete, the kiln is unloaded in reverse with the lumber delivered to dry storage or into the plant.

Dimension stock is similarly handled into the end piling trackless kiln, usually stacked with stickers on sturdy wood pallets designed to provide plenty of clearance for entrance of forks of lift trucks.

Kiln operation is usually of conventional design although some trackless kiln equipment has been redesigned to better provide an unobstructed kiln chamber and to protect heat and circulation equipment from direct contact in loading and unloading. Operators of some of these kilns use extra baffles as a means of varying circulation to eliminate dead spots in the kiln as well as to control circulation according to the height of lumber or dimension stacks.

Trackless dry kilns were reported in use in all parts of the United States and Canada. One Canadian concern was reported to be operating 19 trackless kilns, with a total drying capacity of 85,000,000 board feet per year.

Another report claimed that three men with lift trucks regularly handle all stacking, yarding and kiln-loading-and-unloading with the assistance of the trackless kiln operator of all lumber and dimension, in thicknesses ranging from 4/4 to 12/4 and in a volume of about one-half million board feet a year. This would require at least two handlings for kiln drying, or three handlings where lumber and dimension is required to be stacked in the yard storage area.

The efficiency of the trackless kiln in drying is comparable with the conventional dry kiln. Most of the troubles and headaches encountered in trackless kiln operation have been due chiefly to method of handling lumber in and out of the kiln with the lift truck, such as careless lift truck operation, displacement of cross ties or bolsters in handling, or improper placement of bolsters in stacking to cause breakage and distortion of lumber.

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This attractive new development in label identification means savings in time and money by reducing the margin of error in package recognition for supplier and consumer.

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The "upside-down" machine

A "loafing" machine might as well be upside down. When it's idle, it's useless—and unprofitable.

It would be hard to find a bigger "loafer" than an idle machine when it's "down" while its knives are being sharpened, maintained or tested.

A "loafing machine" costs money three ways—(1) an expensive capital investment isn't working; (2) labor employed at maintaining knives is "non-productive"; and (3) "lost" production is expensive and wasteful.

Down Time Can Be Eliminated

Loafing machines can be put to work and "down time" eliminated—with carbide knives.

Not only do Marcoloy Carbide Knives eliminate most "down time", but they frequently make it possible to increase the feed of the machine, hence increasing production.

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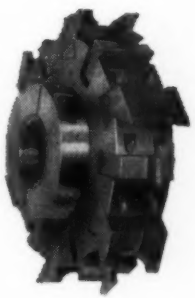
Best of all, they frequently pay for themselves in savings over a few months.

We don't claim that they'll solve all your problems, but they can and will solve most of your "knife-wear" problems.

Why don't you write us about one of your "knife-wear" problems. There is no obligation for our recommendations.

MOULDER "LOAFING" CURED by the MARCOLOY CARBIDE SYSTEM

This typical Marcoloy Carbide Knife Assembly for a moulder will cut "down time" and keep your moulder from "loafing".



The Marcoloy Carbide System starts with the right design of carbide knives for the machine, the cut, the feed, the stock. The cutter head is especially designed for Marcoloy carbide knives. Marcoloy also recommends the right maintenance and sharpening procedures so that you get full value from your carbide equipment. That's the complete Marcoloy Carbide System.

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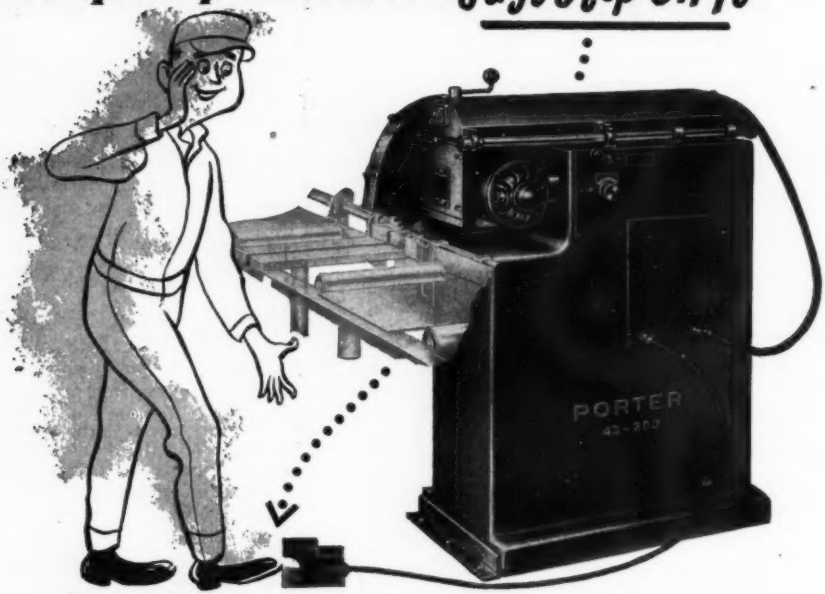

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The new Porter Bulletin 43-20J-1 fully explains the Automatic Hydracut Saw. *Send for your copy today.*

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F. P. L. DEVELOPS NEW FLOORING BLOCKS

IN RESPONSE to increasing demands for hardwood flooring that can be laid directly on concrete surfaces, engineers at the U. S. Forest Products Laboratory, Madison, Wis., have developed a flooring block that utilizes low-quality hardwood, needs no tongues and grooves, and is assembled from small pieces without glue or metal fasteners.

A floor of these 9″ square blocks, ¾″ thick, was recently put down in a Laboratory office with four types of mastic, three of which are relatively recent developments. Within a year, the engineers hope to be able to estimate how well this flooring will stay in place.

As more and more American homes are built directly on concrete slab foundations, the demand for hardwood block floors is expected to expand. A survey by the Forest Products Laboratory in 1950 showed that 20% of the homes built that year had slab foundations.

The popularity of hardwood blocks has led some manufacturers to cut up regular hardwood flooring to make them. The new method of making blocks offers possibilities of better utilization of material that will not yield high-grade long cuttings.

The blocks themselves are the essence of simplicity. They use no nails or other metal fasteners. Nor is any glue used in their construction. Hardwood and hardwood alone goes into them.

The test floor recently laid at the Laboratory is made up of about 270 blocks of random hardwood species, including red and white oak, hickory, birch, and maple. Bruce Heebink, engineer of the project, points out, however, that any hardwood dense enough to wear well as flooring can be used.

Each block contains six or seven individual pieces, 1″ to 2″ wide and 9″ long. The various species are intermixed in each block to give a pleasing, many-hued appearance, ranging from the creamy white of birch to the chocolate-brown of dark hickory heartwood.

Finished wood-block floor with two coats of clear sealer shows richly varied color and grain patterns of mixed hardwoods.

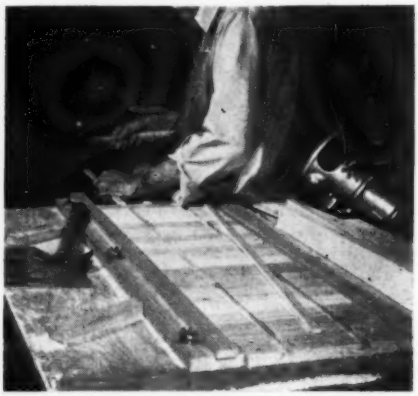
Laying up rough-grooved pieces of random width in a jig to make assembly three blocks in length. Side rail of jig is bolted tightly against ends of pieces.

The individual pieces are fastened together by taking advantage of wood's natural tendency to swell as its gains moisture from the air. The pieces, which have a moisture content of about 8%, are clamped together in a jig and two dovetail cuts, ⅜" wide and ⅜" deep, are made in what will be the underside of the block. A shaped hardwood spline dried until completely free of moisture (oven-dry) is driven into the dovetail slots. As the spline picks up moisture vapor from the air, it swells and holds the pieces in the block rigidly together.

Finish-cutting dovetail groove in assembly with a router.

Even dry indoor air ordinarily contains plenty of moisture to make an oven-dry piece of wood swell tight in the grooves, much as an excessively dried window sash will swell in its frame.

The conventional method of fastening pieces together for flooring blocks consists of tongue and-grooving each individual piece and then stapling or nailing a metal spline to the pieces as the binding support. In addition to being a time-consuming process laborwise, tongue-and-grooving wastes ¼" of each piece of flooring.



Oven-dry splines are driven into grooves.

The individual pieces of the new blocks are merely ripped on a saw, and the edges are left unplaned. Tests indicate that slightly fuzzy cuts are superior, since they allow more room for swelling of the material.

Assembly with splines in grooves is removed from jig. It is then ripped into 9-inch-square blocks.

To speed fabrication, blocks can be assembled in multiples of their length. In the Forest Products Laboratory tests, the blocks were assembled in a jig to triple length, then crosscut to the desired square shape.

One question the engineers hope to get an answer for from the test is: How well are these blocks going to stay in place without tongue-and-grooving?

"We expect to have the answer to that question in a year," said Herbert Eickner, adhesion expert on the project. "By using these recently developed mastics, we hope to be able to do away with the need for tongues and grooves completely."

The test floor at the Laboratory was divided into four quarters, and a different type of adhesive was used on each quarter. By next year, the engineers should be able to tell which adhesive is giving the best performance.

The four types of adhesive used and

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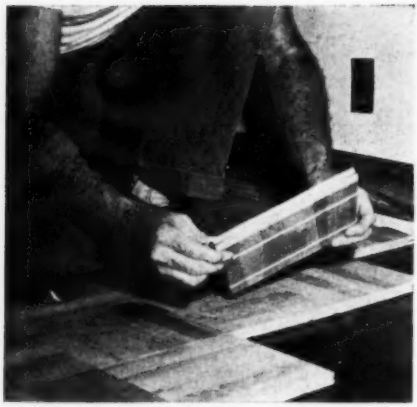


In quarter-section of experimental floor coated with mastic adhesive, veneer splines were inserted in corner grooves to help hold blocks flat.

the methods of application employed were:

1. Rubber-base contact cement.—This conventional type of counter-top cement was spread on both the concrete floor surface and the back of the blocks, and after one hour of drying to produce a tack-free surface, the blocks were laid in place.

2. Cutback rubber-base mastic.—This adhesive was applied only to the floor at a rate of about 75 square feet per gallon of mastic, and the blocks were laid in place after it had dried for 30 minutes.

3. Rubber dispersion mastic.—This mastic was spread only on the floor at a rate of 150 square feet per gallon, and the blocks were laid in place after it had dried for 10 minutes.

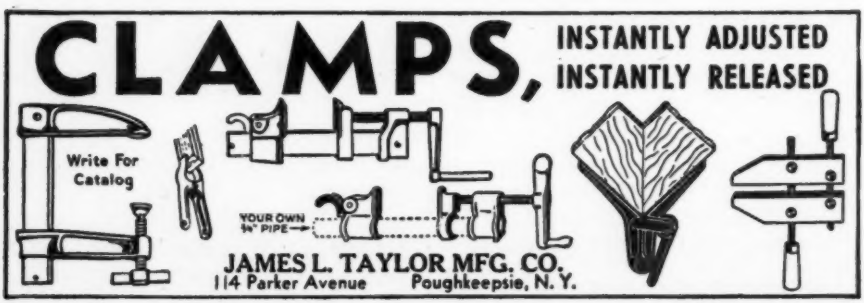
4. Cutback asphalt cement.—This cement was applied only to the floor, but since the engineers doubted the ability of this cement to hold, the blocks were grooved at the corners and fastened with 1" square pieces of ⅛" veneer.

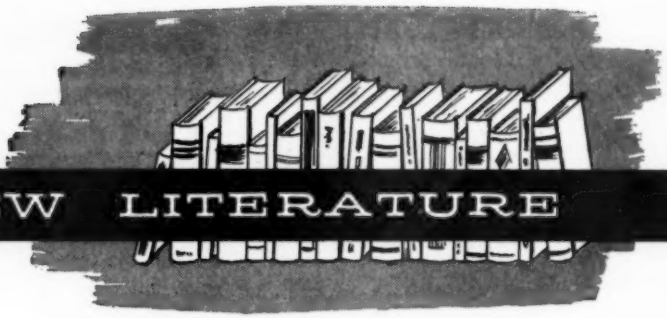
After the glues dried, the finishing touches were given to the floor. First it was sanded, and then two coats of clear sealer were applied to produce a rich and striking finish.

MEMORY JOGGER-TRAINING AID

Newest publication of The National Foremen's Institute is the illustrated, 48-page "Guards Memory Jogger," a combination training aid and daily log book developed by the National Foremen's Institute of New London, Connecticut after two years of research and consultation with plant security directors and guards in industrial plants throughout the country.

"Jogger" is issued once a month in any quantity specified by the subscriber. Each monthly issue contains a quick reference, 2-year calendar as well as daily calendar pages.





NEW LITERATURE

GLUE PUBLICATION

National Casein, Chicago, Ill., has announced the monthly publication of the new "National Casein Executive Review." Several interesting articles from well known magazines that are of great interest to the busy executives are included. Each month an educational article on glue room helps and casein information are included along with a personality profile of plant personnel.

A copy of the National Casein Executive Review is available through National Casein, 601 West 80th St., Chicago 20, Illinois. Dept. ER-27.

HARDWARE CATALOG

Engineered Products Company, manufacturers of well known EPCO hardware specialties, has just announced the publication of a new fully illustrated combination catalog and price list of their products.

In addition to illustrations, it contains scale drawings and every item of information needed about all EPCO products, including E-Z Glide fiber and aluminum glass door track, Magna-Tite lifetime magnetic cabinet catches, Snug-Tite, E-Z Roll and Screen-Master catches, Decorator cabinet door and drawer knobs and aluminum cabinet framing.

These catalogs are available from Engineered Products Company, P. O. Box 118, Flint 1, Michigan. Specify catalog No. 18.

A.W.P.A. STATISTICS

Wood preservation statistics as compiled by Gordon D. Merrick of the United States Forest Service show that production of wood given preservative or fire-retardant treatment declined slightly during 1954, according to B. D. Howe, president of the American Wood-Preservers' Association, and chief lumber inspector of the Louisville and Nashville Railroad Co., Louisville, Ky.

The official 1954 report, prepared by Merrick in co-operation with AWPA, has just been released. Its voluminous statistics represent the output of 308 wood preserving plants (20 more plants than reported in 1953) of which 209 were pressure treating plants, 84 non-pressure, and 15 equipped for both kinds of treatment. Wood treated by them is protected against decay, termites and other insects and marine borers, or is made fire retardant.

Total volume of wood treated in 1954 was 250.7 million cubic feet, of which 95% was treated by pressure processes. The total was down about 1% from 1953. An increase of 4% over 1953 was noted in the treatment of fence posts.

While the use of distillate coal tar creosote decreased about 16%, about 85% of all material treated was treated with creosote or a creosote solution. The use of pentachlorophenol increased about 54%.

In 1954 the industry consumed a total of 216,376,145 gallons of liquid preservatives and 16,014,690 pounds of solid preservatives.

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HOW TO DESCRIBE WOODS

Everybody's "against sin" and almost equally true is the fact that very few people understand "legalese" wording and can readily translate it into every-day statements.

With this in mind, Burdette Green, executive vice-president of the Fine Hardwoods Association, Chicago, has translated the recent Federal Trade Commission "Trade Practice Rules" for the radio and television industry, and the earlier FTC "name the wood" rules which the new rules supplement, into simple wording easy for everyone concerned with describing the composition of furniture, television and hifi cabinets to understand.

Copies of the simple "how to label and describe" directions, which are valuable for both manufacturers and retailers, are obtainable from the Fine Hardwoods Association, 666 Lake Shore Drive, Chicago 11, Ill.

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You save cutter expense and time with ONSRUD carbide router bits—because you buy fewer bits and stop for sharpening less frequently. For hard or abrasive materials, synthetics, plastics and metals, these cutters are the last word. They often fill the bill where all others fail. The grade of carbide used in these bits is of proven quality, tough as well as hard to withstand the shock and vibration incidental to hand fed routing.

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REDWOOD DATA SHEETS

Two widely consulted data sheets issued by the California Redwood Association—REDWOOD SIDING (3A4-1) and BOARD AND BATTEN WALLS (3A4-2) are now available in revised form. Correct handling and assembly of redwood siding are the chief concerns of both data sheets. Proper construction to eliminate moisture condensation problems in cold weather areas is emphasized.

Direction regarding the proper handling of siding, its application to ensure weather tightness, and ventilation measures are included. Nailing practices, because of their paramount importance to sound construction, are dealt with in detail in the two data sheets.

Copies may be obtained by writing to the California Redwood Association, 576 Sacramento Street, San Francisco 11, California.

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A new 25-page, 1956 catalog describes 52 portable electric tools and kits with over 400 accessories. This free book includes 150 pictures of tools and their uses with complete specifications and prices for electric saws, sanders, drills, planes, routers, shapers, combination tools and grinders.

Write for catalog No. 102, Porter-Cable, 58 Exchange Street, Syracuse 8, N. Y.

BOOK ON WOODWORKING MACHINE OPERATION

A book just recently published is said to contain much valuable information on the operation of woodworking machinery. The book is written in clear, concise, everyday "shop talk" language and is intended for the actual machine operator as well as the plant superintendent, foreman, and engineer.

The book discusses molder operation; molder and planer stoppages and their

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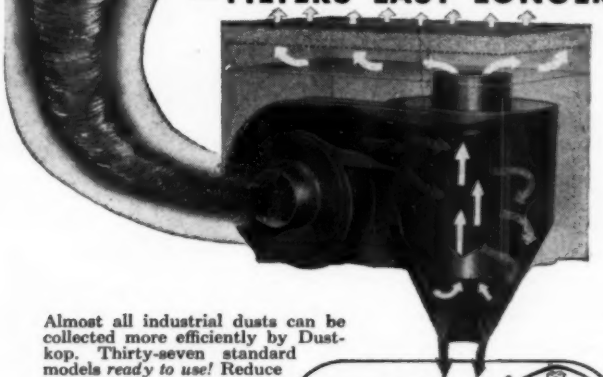

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remedy; machining defects in wood and their remedy; jointing knives; use of proper cutting angles and bevels on knives; selection and care of cutterhead and knives; composition, use and care of grinding wheels; wood defects of all types; structure of wood; common woodworking pattern names; lumber abbreviations; safety and other worthwhile subjects.

The book is titled "Knife Grinding and Woodworking Manual," size 10" x 11", contains 167 pages with 187 action pictures, charts and drawings, and is the first book expressly written in the machine operator's language. Author of the book is C. G. Monnett, Jr., vice-president of the Dependable Machine Company of Greensboro, N.C.

Copies of the Knife Grinding and Woodworking Manual are offered on a money back guarantee of $4.50 plus $.50 postage and mailing fee. Write C. G. Monnett, Jr., Route No. 7, Box 345, Greensboro, N.C.

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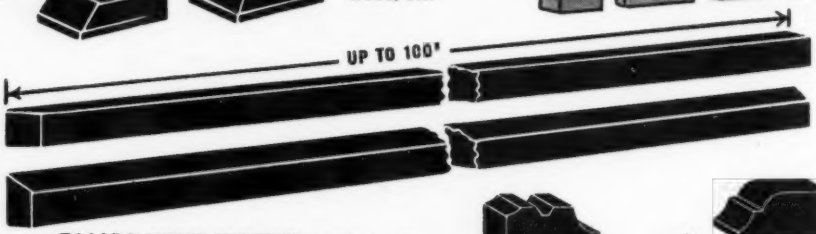

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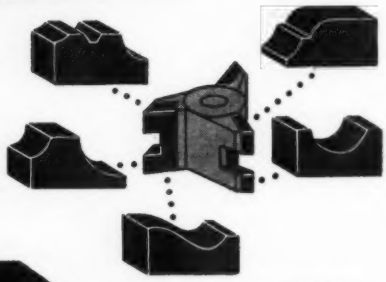

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Bulletin M-755 on the new Diehl 12" molder has been released by The G. M. Diehl Machine Works, Inc., of Wabash, Ind.

All the advanced features of the new Diehl molder are described and illustrated in the bulletin, including greater flexibility offered by this larger capacity machine, new spring pre-loading against spindle bearings, new variable speed drive, new optional double-tapered detachable type spindles, new feed roll assembly, new feed works assembly, new motor controls, new electrical control panels, new air hold-down, new chip-breaker arms, new top and bottom jointers, new cast-aluminum dust hoods . . . and other special features of interest to the woodworking industry.

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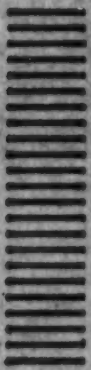

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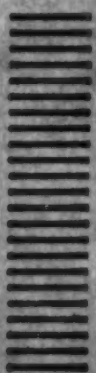

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VENEER, PLYWOOD and LAMINATED WOOD

FEATURES

Plywood Utilizations
By Thomas D. Perry

Lamination Improves Hull Design of Wooden Ships
By A. Meredith Johnson

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PLYWOOD UTILIZATIONS

By
Thomas D. Perry

OVER the last few years, WOOD WORKING DIGEST has presented its readers with several series of monthly articles on the various phases of plywood; what it is, how it is made, the adhesives available, the types of machinery required, etc. These series have also discussed the various advantages inherent in plywood, as contrasted with materials that have been superseded, or which are still active competitors in important applications. Several of these series have been reprinted in booklets and are available, see page 88.

Plywood has often been called the "wonder child" of the wood industry and is well deserving of this title, as has been demonstrated by its amazing growth during the last 20 years and more. Dr. Wilson Compton, for many years secretary-manager of the National Lumber Manufacturers Association, in his introduction to "Modern Plywood" (1942, 1948), has succinctly stated:

"The rise of plywood is one of the most dramatic and significant chapters in the history of the American lumber and timber products industry. Little more than a novel idea during World War I, it has now become an industrial giant."

A single challenging comparison can be made with what is considered the manufacturing marvel of our time, the automobile. The unit production of autos increased some 90% from 1940 to 1954; while the production of fir plywood (not including hardwood plywood), footage-wise, has increased over 125% from 1942 to 1955. The year 1942 was when Dr. Compton wrote the above excerpt. This comparison will be well worth watching in the years to come!

This stupendous growth of plywood is abundant justification, if any is needed, for this sixth series of articles, which is now making its bow on the printed page. The general title will be "Plywood Utilization," and will endeavor to give an interesting and intimate story of the many industries and products in which plywood has become an essential factor. Many of them will be unusual applications, which seldom reach the public eye, some of them will be the more conventional and well recognized uses. It is hoped, before the series is completed, to suggest most of the products in which plywood plays a part. This project involves a considerable amount of careful investigation, and the order in which the data

Figure 1. Modern sheds for aging tobacco. Courtesy Liggett & Myers Tobacco Co.

become available for publication cannot be predicted in advance. Among the subjects on the schedule are:

Tobacco Hogsheads
Sports Equipment
Plywood on Mount Washington
Musical Instruments and Plywood
Plywood in Aircraft
Plywood and Plymetal in Highway Trucks
Molded Plywood Boats
Plastics and Plywood
Hollow Girders of Plywood, etc.

It is quite likely that readers may be able to suggest applications for plywood, which have not come to the attention of the writer. All such suggestions will be carefully considered and fully investigated.

TOBACCO HOGSHEADS

The use of tobacco by millions of Americans is firmly established, in spite of many ardent campaigns to limit or abolish its use for sanitary or health reasons, or for its continuing strain on the purse strings. Most men, and now women as well, seem to thoroughly enjoy their favorite smoke, even though the habit may curtail some of the essentials of comfortable living. The slogan "Give us our luxuries, we can get along without our necessities," seems to apply particularly to confirmed smokers. Sir Walter Raleigh and Sir Francis Drake started something, when they introduced tobacco and pipes from Virginia to England in the late 1500's; and no one has been able to stop the spread of the habit.

Tobacco farms, or plantations, curing sheds and warehouses for tobacco leaves, and public tobacco auctions have become big business, running into many millions of dollars annually.

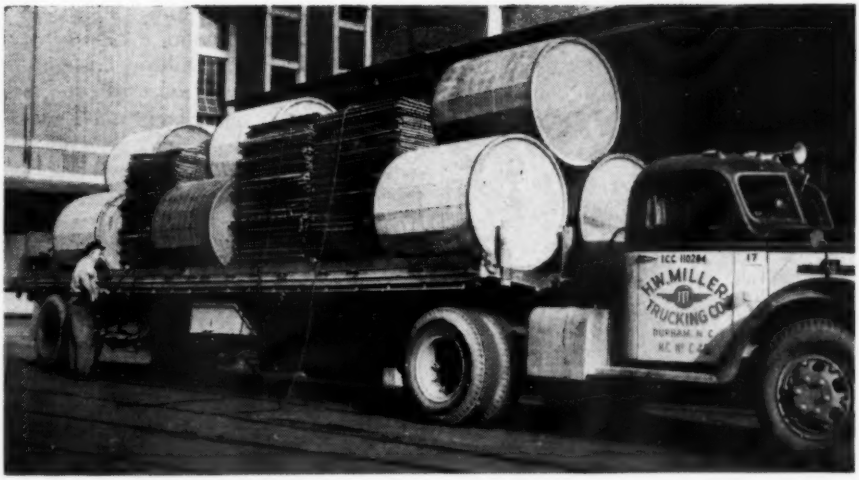

Figure 2. Truck loaded with empty hogsheads.

Some idea of the magnitude of these curing or aging sheds can be gained from the picture in Fig. 1. One of the larger tobacco companies alone has 5½ miles of such sheds in various parts of the tobacco growing areas. The hank, or twist or bundle of tobacco, has to make at least two important trips, in suitable packages from safe, economical and convenient handling en route; i.e., from the aging sheds to the auction room, and from the auction room to the tobacco manufacturer. In addition to these major trips, the hanks of tobacco have to be handled into and out of the hogsheads three or four times, for the several processing steps between the growing plant and the packaged cigarette, cigar or pipe tobacco. Automatic machines for making cigarettes were developed into the middle 1880's, but the clumsy handling of raw tobacco had little attention until around the 1930's. It was a curious medley of efficiency and awkwardness within a single industry!

HOGSHEADS OF YEARS AGO

When hogsheads of wood were first made for conveying tobacco is not recorded, but it is known that the first hogsheads were modeled after the well established barrel. They were made of straight, but not flat, oak staves, in the form of a drum or cylinder, without bilge. They were more or less elaborately made at cooperage plants, with most of the conventional features of the bilge barrel, chime, croze, heads, hoops, and curved staves. They were unnecessarily clumsy, not adapted to opening and closing, were often dismembered in the process, the staves often split and the chime and croze were damaged. At best they were good for two or three trips, with considerable intermediate repairs.

This construction was gradually simplified by using cleated lumber heads to which the staves were nailed. Almost any species of native timber was used. The result was a less costly hogshead, but there was no improvement in

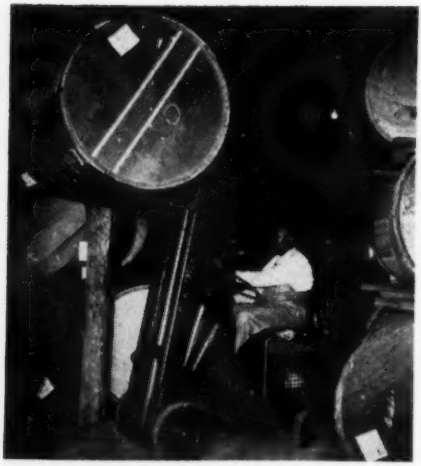

Figure 3. Piling sturdy plywood hogsheads on racks with lift trucks.

its serviceability and repairs proved to be even more costly. The empty barrel was very bulky to store and unjustifiably expensive for return trips, because of its bulk/weight ratios. There was, therefore, little or no encouragement for reuse. In order to remove the contents the loaded hogshead, weighing several hundred pounds, had to be upended and lifted off the tobacco, often with substantial damage to its contents.

IMPROVED HOGSHEADS

As the tobacco business flourished and grew apace, this type of clumsy hogshead, its bulk, its short useful life, and its repair demand became intolerable. Someone with ingenuity originated and developed the idea of making a more or less wirebound continuous side of narrow lumber slats, which could be wrapped around the circular heads. Roughly the method was to staple 6 or 8 wires to a series of narrow and flat lumber slats, instead of concave staves. The slats were parallel, spaced slightly apart, to permit an easy sweeping curve around the periphery of the heads. The resulting ventilation in the hogshead was an advantage, especially in storage. Every slat had a short cleat nailed or stapled firmly on each inside end to hold the heads in place in the assembled hogshead. When the side was wrapped around the bottom head, the wire ends were twisted together, except two or three near the top, which were left loose to insert the head after loading.

This design greatly simplified unloading the contents, as the sides could be unwrapped without damage to the hanks of tobacco, a real saving in labor and quality. The cost of returning these unrolled sides resulted in further substantial savings in the storage and transportation of empties.

This hogshead side that could be unrolled flat was a sound idea, but much more remained to be done to overcome the limitations that were still troublesome. It was a marked improvement over its earlier counterpart that could not be disassembled. The flat wirebound sides required only a tenth of the space of the assembled empty, in handling, for transportation and for storage. However, as the business still continued to grow in volume, even this improved hogshead proved to be a serious handicap in handling the tobacco crop. As the slats and heads were customarily made from 4/4 lumber, the empty hogsheads were heavy, averaging from 200 lbs. per hogshead when made of oak, down to 175 lbs. when lighter species of wood were used. The solid wood slats continued to split and splinter, as did their predecessor staves, both at the fastenings and at the ends. Nevertheless it proved to be an inter-

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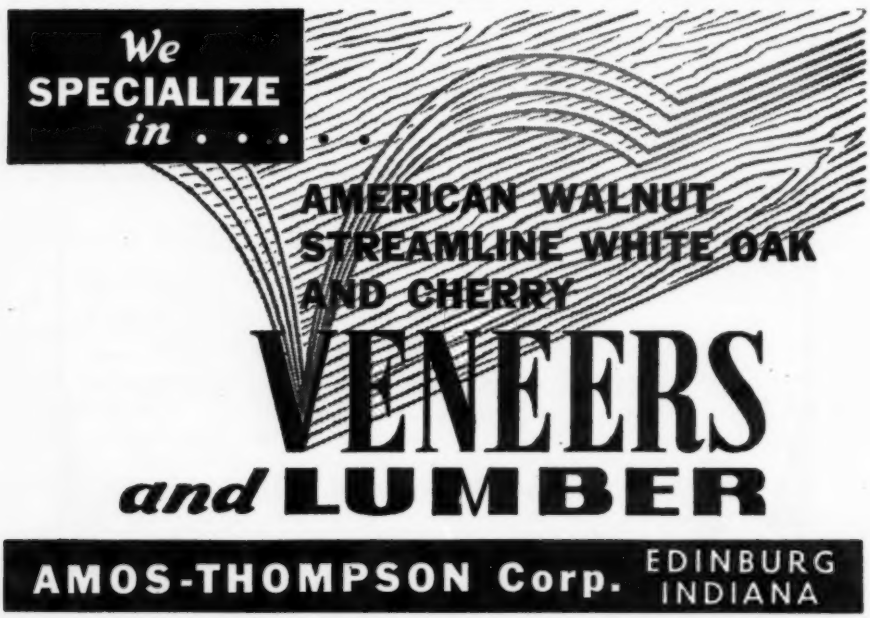
PLYWOOD HOGSHEADS

Credit for the development of the plywood hogshead undoubtedly belongs to R. S. McConnell of Silver Springs, Maryland. He was a courtly cigar smoker, who was attracted by the latent possibilities in Douglas fir plywood made on the Pacific Coast, which in the early 1930's was more or less of a novelty. After some study and experimentation he finally persuaded the B. J. Reynolds Tobacco Company, in 1936, to substitute thin fir plywood strips for the 4/4 lumber slats they were using for the sides of their hogsheads. His project seemed to be largely motivated by the need of overcoming the splitting in the lumber slats and of reducing the weight of the hogshead. These new plywood staves were still wirebound, leaving much to be desired in fastening and opening the hogsheads. The use of these thin nonsplittable slats of plywood proved to be an eye-opener, and brought about distinct economies, both in transportation and maintenance.

This was the starting point for the organization of the Collapsible Container Company under the McConnell patents, and many technical improvements in design followed. Five steel bands were substituted for the wires and the sides were made in two halves. Each half consisted of some 15 plywood staves, 5/16" thick by 7" wide. The staves were stapled to the steel bands, and a half hinge built into each end of the steel bands, requiring only loose hinge pins to setup or knock down the hogshead. Cleats were stapled or nailed to the inside end of each



plywood stave to hold the heads. These flattened half sides, about 6″ square, were found not to be too difficult to handle and stack. The heads were made of ½″ plywood. The weight of the hogshead was thus reduced from the 200-175 lbs. range to one of 110-90 lbs., some 50% saving. The maintenance charges for repairing hogsheads soon became relatively insignificant.

Collapsible Container Company now makes 10,000 hogsheads for the Liggett & Myers Tobacco Company alone. An attempt was made to trace a single stock hogshead and keep check on the number of times it was reused. The score stood at 75 when the trail was lost! Workmen claim to have recognized some of the first hogsheads made by Collapsible, which were still in service after more than ten years of continuous hard work.

The B. J. Reynolds Tobacco Company developed a plywood hogshead of quite a different design, but serving the same functions. The sides were made of single sheets of plywood curved into half cylinders and hinged together at the joints with loose hinge pins. When disassembled these curved halves would nest for convenient storage and shipping. The empty and dismembered units are often stored on end, if the necessary space is available, since a high nested pile may be unwieldly.

CONCLUSIONS

It is estimated that about two million plywood hogsheads are in use by the larger tobacco companies. While a large proportion are of Douglas fir plywood, a considerable number have also been made of native southern hardwood species. While two of the ply-

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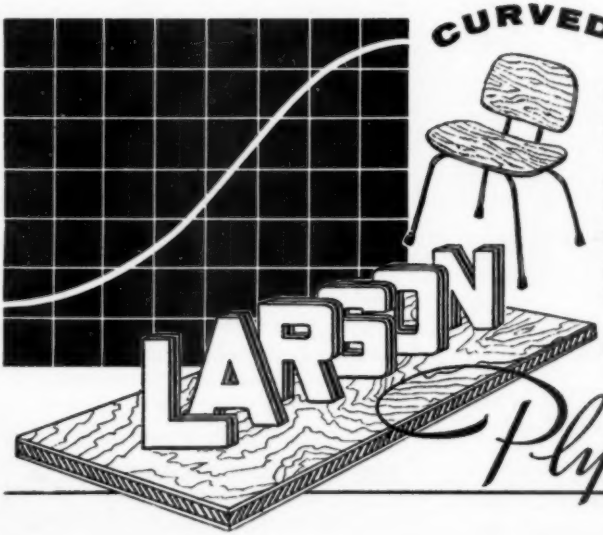

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wood designs have been briefly described, there are several other manufacturers of hogsheads who have modified the plywood constructions in several ways.

It may be well to sum up the advantages of the plywood hogshead, in contrast to its earlier counterparts, as a demonstration of the valuable service plywood has rendered in the tobacco handling field.

1. Plywood has reduced the net weight of the hogshead some 40%, a factor that affects transportation costs and handling.

2. Plywood has reduced the bulk of the empties. The space required for a setup empty will accommodate 6 to 10 knocked-down units. This is illustrated in Fig. 2, showing a motor trailer loaded with nine hogsheads containing only disassembled plywood heads, and approximately 150 flat sides stacked on pallets for handling by lift trucks. The same trailer would carry 18 hogsheads loaded with tobacco. This is a truck loading ratio of 8 to 1 in favor of the empties.

3. Plywood staves have reduced the repairs to a minimum. Whereas, in former days, many coopers were required at each of the industry's 125 redrying and buying points, now one part-time man at each plant can fit the occasional repair jobs in with other duties.

4. The plywood hogshead is much sturdier than its predecessors, and does not tend to lean askew, as they did. It is easily handled with lift trucks, as

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shown in Fig. 3, and rolls readily on racks. The older types were often "out of round" and could be rolled and nested only with great difficulty.

5. The flat disassembled empties can be piled on skids or pallets, and handled with lift trucks in packages of 40 units or more.

6. The useful life of the older hogsheads was from 3 to 10 trips, while the plywood hogsheads seem to be well nigh indestructible. This is shown by the units that have made 75 trips or are still in service after 10 years.

7. Removing the tobacco from the older types of hogsheads inevitably injured the product, while unloading the modern plywood hogshead is no more than unwrapping it.

8. Obviously plywood hogsheads cost more, but authorities seem to be agreed that one of the new units is worth at least ten of the older types.

All in all, the success of the collapsible plywood hogshead for tobacco has been so phenomenal that many other industries are carefully investigating possible applications of similar designs to many other products; designs in which light weight and facility for reuse are important considerations. An example is the fruit and package crate, with top, bottom and both sides wirebound into one unit, chiefly to reduce weight, without sacrificing strength.

Plywood has acquitted itself with unusual credit in the tobacco industry.

The data and photos for this story were supplied by the Douglas Fir Plywood Association, whose cooperation is gratefully acknowledged.

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LAMINATION IMPROVES HULL DESIGN OF WOODEN SHIPS

A. MEREDITH JOHNSON
Hull Design Section, Bureau of Ships
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THE MODERN naval architect thinks in terms of steel for the hulls of all but small craft. Wood as a construction material for ships has been relegated to minor items such as decorative finishes, partitions, furniture, cargo battens, dunnage, or deck covering. This is a far cry from that era 100 years ago when the position was reversed and iron products merely supplemented wood, the principal hull material.

During periods of world conflict when demands upon steel became greater than resources or manufacturing capabilities, wood assumed renewed importance in the shipbuilding industry, but its rise was short and fleeting. Furthermore, the transient nature of wood shipbuilding programs during these times of frantic emergency was generally detrimental to the reinstatement of wood as a prominent shipbuilding material. Design was often wasteful of material, ships were hastily constructed, and little attention was given to preservation. The direct consequence was that wood fell in even more ill repute among the naval architects.

Wood is one of the most abundant natural resources this country possesses. Were the material inherently weak and

worthless for construction purposes no concern would be felt for its lack of use. The fact of the matter is that wood, on a strength-weight basis, is one of the strongest materials known to man, having a specific strength over three times that of steel. For example, the bending strength-specific gravity ratio of Douglas fir is 24400 while the same ratio for steel is only 7650, and the weight of wood compared with steel for sections of equal strength in bending is only 15%.

Design in accordance with classification rules is often wasteful of the basic material, especially in view of its superior strength-weight qualities. The present scantling rules seem to be based more upon a theory of strength through mass than utilization of inherent capabilities. The greatest limitation in the use of wood is the relative weakness of joints and fastenings. Classification rules attempt to cope with this limitation by the use of mass and brute strength. The problem can now be more effectively overcome through utilization of modern manufacturing techniques and new developments in the art of wood fabrication.

EARLY DESIGNS

The history of wooden ships reveals that 100 years ago, when construction with this material was at its peak, many interesting features were incorporated in design. Planking systems were varied and, by present standards, unusual. In many cases layers of planking were laid transversely, diagonally, and fore-and-aft, all in the same vessel. Frame spacing in large vessels was as much as 60″ and heavy longitudinal members were almost non-existent in many designs. For instance, one of the series of royal yachts "VICTORIA and ALBERT" was 338′ overall length, of 40′ beam and displaced 2345 tons at a draft of 16′. Her outer skin consisted of diagonal planking covered by fore-and-aft planking 3″ thick. This planking system was supported by double-sawn frames spaced 60″. She was launched in 1855 and saw at least 44 years of useful service.

Another unusual design was the 700 ton clipper ship "VISION" with frames sided 8″, molded 6″ and spaced 56″. Planking consisted of a transverse course 1⅜″ thick, followed by two 1″ diagonal courses, and finally the outside planking of 4½″ red pine laid fore-and-aft. The only longitudinals used were keel, single keelson, and light clamp and shelf. Numerous examples of similar designs occur in history, but the two cited are sufficient to illustrate the retrogression of wood ships design during the past century. The challenge is to break free of traditional construction, study the teaching of the masters of a century ago, and progress from there to constantly improve and refine designs in wood.

CONVENTIONAL DESIGN

The midship section illustrated in Figure 1 is a typical example of wood shipbuilding in accordance with classification rules. Continuity of strength is achieved by overlapping of a series of separate pieces of wood with component parts of the vessel mutually supporting and clamping each other. Because of the lack of continuity of individual members, strength is achieved only by piling piece upon piece until an uneconomical mass is the result. The frames are sawed from planks and in order to eliminate cross grain the planks must be a series of short sections oriented to the shape of the frame.

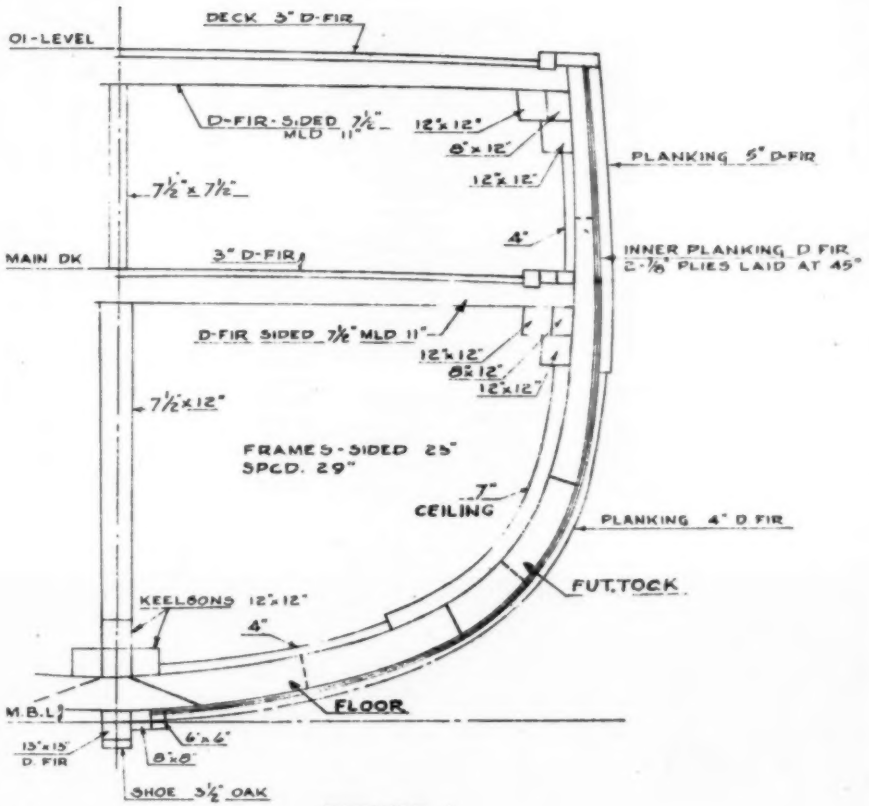

FIGURE 1

SCANTLINGS BASED
ON CLASSIFICATION RULES

Since these pieces cannot be attached together endwise, other shaped pieces are laid to act as buttstraps and are in turn supported by the first piece. The frame thus becomes a series of sections called floors and futtocks, each mutually acting as buttstraps for the other. The frame of Figure 1 consists of two sets of sawed timbers, each set being made of planks of 11½" thick. Any semblance of continuity of strength through the frame must result from a dubious system of short pieces of wood and the fastenings connecting them. To insure that the frame holds together an inner skin called ceiling is introduced so that the frame may be clamped between it and the outside planking. In order to assure transverse strength at the keel, massive longitudinal timbers called keelson, sister keelson, and rider keelsons, and transverse members called floors are, together

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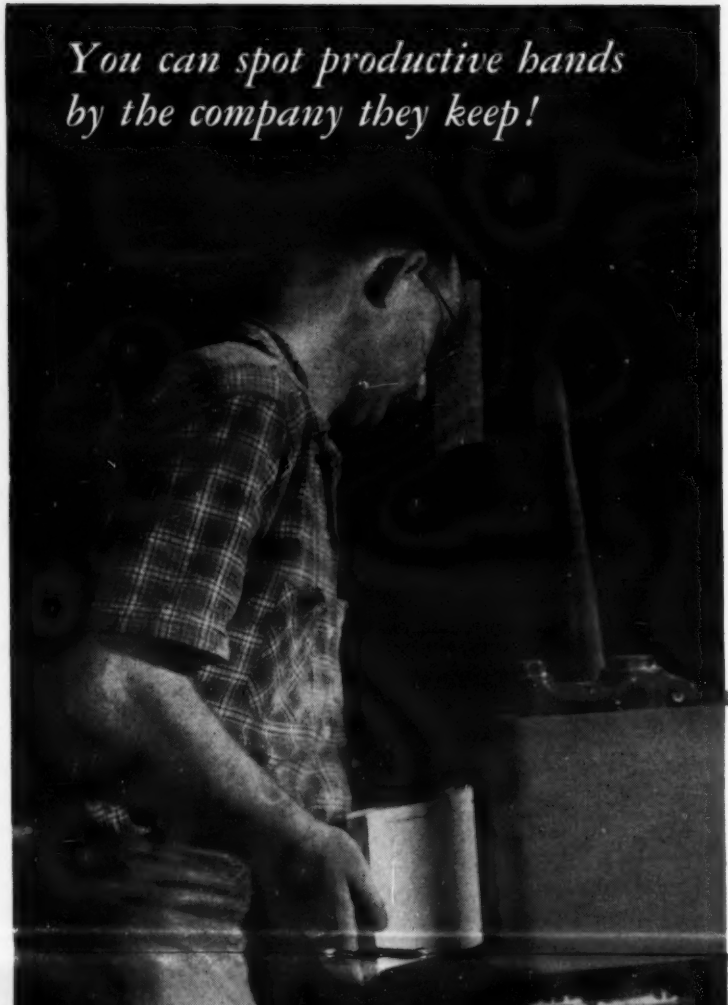

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with the frames, bolted together into one mass of lumber. Transverse strength at the intersection of a deck beam and shell frame is achieved in similar manner by means of heavy clamps and shelves connected to frames, beams, ceiling, deck planking and to each other. In lieu of the clamp and shelf construction, the classification rules will allow massive knees fastened between shell frame and deck beam.

A large proportion of hull weight is absorbed by framing hence this is a fertile field for weight reductions. There is little justification for materially reducing longitudinal framing since each piece contributes to the longitudinal strength of the vessel. However, such material can be gainfully re-distributed away from the neutral axis and transformed into items such as hull and deck planking. Transverse frames are in an entirely different category and should be proportioned as lightly as possible to do their job of holding the hull in shape between bulkheads. To remove such members as keelson, sister-keelson, rider-keelson, floors, etc., necessity for clamping frames at the keel must be eliminated. Obviously, then the fráme must be continuous across the keel. Furthermore, in order to preserve the strength thus gained, the frame must be made continuous from head to head.

A second field for weight reduction is the heavy ceiling of conventional construction. Longitudinal material utilized on the inboard side of the frame can be more advantageously employed strengthwise in the outboard side in the form of planking. Removal of this ceiling immediately poses a problem of substantial magnitude. Without the clamping action afforded by planking and ceiling, conventional futtock frame construction cannot be safely employed. Obviously a solid frame is the solution to the problem, but unfortunately very few trees grow in the shape of a midship frame for a large vessel. It is true that certain types of trees are cooperative in that they lend themselves to being reshaped by bending, but in large sizes and long lengths they come few and far between. The only other solution is to manufacture a solid piece of lumber to run continuously from head to head and of the correct shape to keep the hull fair.

WORLD WAR II YMS

One of the most pronounced advances in wood ship design suitable for production in large numbers was the YMS of early World War II design illustrated in Figure 2. The scope of this change of concept of design can be appreciated by comparing the constructions illustrated in Figures 1 and 2. Two major departures from conventional construction were complementary, in that elimination of the piecemeal futtock frame construction removed the necessity for clamping action afforded by a ceiling and conversely, elimination of ceiling construction necessitated built-in continuity of frame. This continuity in the case of the frame was achieved by means of steam bending of unusually long pieces of oak. The elimination of the ceiling also removed in one step a major curse of wood ship construction, namely the poorly ventilated, decay-inducing air space between ceiling and planking. Further innovations in this design were the substitution of light struts for massive knees at the junction of shell frame and deck beam, severe reduction in the number of timbers at the keel line,

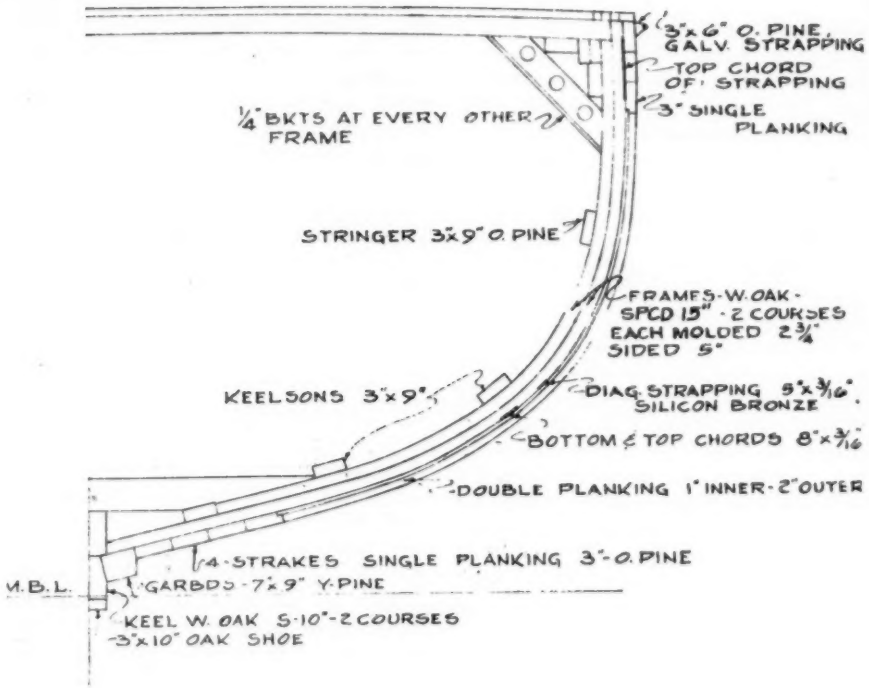

3"x6" O. PINE, GALV. STRAPPING
TOP CHORD OF STRAPPING
3" SINGLE PLANKING
1/4" BKTS AT EVERY OTHER FRAME
STRINGER 3"x9" O. PINE
FRAMES-W. OAK-SPCD 15" - 2 COURSES EACH MOLDED 2 3/4" SIDED 5"
KEELSONS 3"x9"
DIAG. STRAPPING 5"x3/16" SILICON BRONZE
BOTTOM & TOP CHORDS 8"x3/16"
DOUBLE PLANKING 1" INNER-2" OUTER
4-STRAKES SINGLE PLANKING 3"-O. PINE
W.B.L.
GARBDS-7"x9" Y-PINE
KEEL W. OAK 5-10"-2 COURSES
3"x10" OAK SHOE

FIGURE 2

WORLD WAR II
MINESWEEPER
YMS CLASS

substitution of light floor construction, and the reduction of size and number of timbers at the intersection of shell and deck. Furthermore, scantlings in general were made considerably lighter than would be customarily required by classification rules. Unquestionably it took courage and vision to upset precedent and convention to such extent especially in the case of a vessel subject to such rigorous duty as a minesweeper. The excellence of this design has been born out through the years by fine service performance on the part of nearly five hundred ships of the class. Because of its excellent showing, it has been selected as the prototype for the new AMS design now in production.

POSTWAR MINESWEEPER DESIGN

In the early stages of the recent minesweeper program the Bureau of Ships

was faced with the necessity of designing a strong, light, non-magnetic ship to handle heavy minesweeping gear. Having taken one substantial step in the development and refining of wood ship construction, the Bureau of Ships was ready to incorporate new techniques and theories in the process of development. These steps comprised something old and something new in the wedding of modern wood techniques to the oldest construction material known to man. The "old" came from the wealth of knowledge and experience gathered during the days when wood shipbuilding was in its prime; the "new" came from the modern revolution in wood manufacture and assembly. The midship section of the AM421 Class illustrated in Figure 3 is the end result of many months of tests, research, and consultation with experienced wood technologists, naval architects, and shipbuilders.

BASIC CONCEPTS AND CRITERIA

The aforementioned background of history and reasoning led to a basic concept of a new minesweeper design combining new wood manufacturing techniques with tried and tested construction systems. Its foundation was conceived as made up entirely of members manufactured by the technique of wood laminating. Hull stiffness and lightness was gained in the form of double diagonal planking already discussed. Bulkhead strength and stiffness was obtained in the same way. Fastenings were made as small and as numerous as practical in order to spread load transfer over a reasonable area of wood. Deck girders were designed as I beams, fully laminated where possible, otherwise connected together by bolts and split ring connectors. All structural members were calculated using assumed loads as severe as could be reasonably contemplated. Allowable stresses were, in general, based upon the strength of clear, sound, dry wood, a condition almost impossible to find in large solid timbers. The end result as illustrated in Figure 3 is less than 50% the weight of the same basic ship scantlinged in traditional manner.

It became necessary early in the design of the 165′ minesweeper to establish a reasonable criteria of design stresses for laminated timbers. Tables of design stresses for solid timbers were much in evidence, but had little practical value for laminated members. Defects such as knots, shake, cross-grain, etc., which modify the strength of solid timbers do not affect laminates to the same degree since their effect is limited to one ply. On the other hand strength data for clear laboratory specimens cannot be safely used for large structural items because of the ever present variability of structure and strength falling within a single stick of lumber.

In order to arrive at an orderly set of design data, the Timber Engineering Company personnel were called upon for consultation. It was soon apparent that due to the variability of wood, it would be necessary to include an experience factor. The Bureau of Ships publication "Wood: A Manual for Its Use in Wooden Vessels" includes in table 5-2 a list of stresses to be used in design and based upon the strength of clear solid timbers. The design stresses in this table were arrived at by including an experience factor. Therefore it appeared logical to start with the stresses set forth in this table and suitably

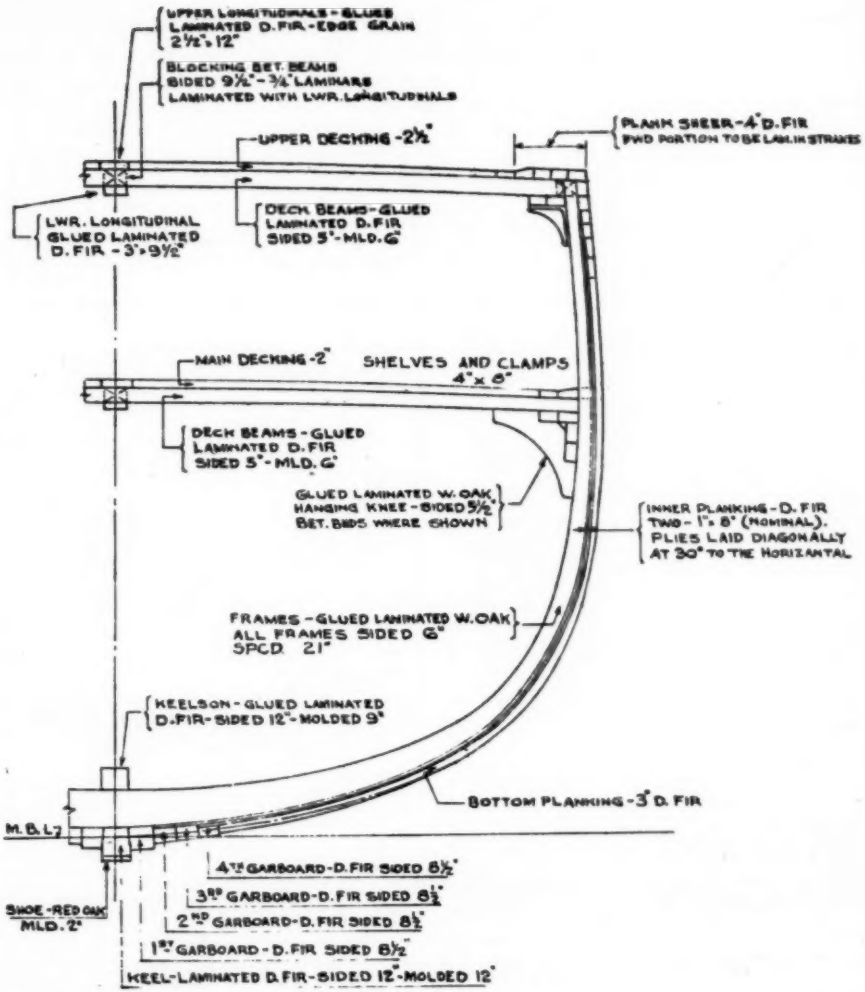

UPPER LONGITUDINALS - GLUED LAMINATED D. FIR - EDGE GRAIN 2½" x 12"
BLOCKING BET. BEAMS SIDED 9½" - ¾" LAMINARS LAMINATED WITH LWR. LONGITUDINALS
UPPER DECKING - 2½"
PLANK SHEER - 4" D. FIR FWD PORTION TO BE LAP-LIN STRAKES
LWR. LONGITUDINAL GLUED LAMINATED D. FIR - 3" x 9½"
DECK BEAMS - GLUED LAMINATED D. FIR SIDED 5" - MLD. 6"
MAIN DECKING - 2"
SHELVES AND CLAMPS 4" x 6"
DECK BEAMS - GLUED LAMINATED D. FIR SIDED 5" - MLD. 6"
GLUED LAMINATED W. OAK HANGING KNEE - SIDED 5½" BET. BMS WHERE SHOWN
INNER PLANKING - D. FIR TWO - 1" x 8" (NOMINAL). PLIES LAID DIAGONALLY AT 30° TO THE HORIZONTAL
FRAMES - GLUED LAMINATED W. OAK ALL FRAMES SIDED 6" SPCD 21"
KEELSON - GLUED LAMINATED D. FIR - SIDED 12" - MOLDED 9"
BOTTOM PLANKING - 3" D. FIR
M. B. L. 7
4TH GARBOARD - D. FIR SIDED 8½"
3RD GARBOARD - D. FIR SIDED 8½"
2ND GARBOARD - D. FIR SIDED 8½"
1ST GARBOARD - D. FIR SIDED 8½"
SHOE - RED OAK MLD. 2"
KEEL - LAMINATED D. FIR - SIDED 12" - MOLDED 12"

Figure 3. Postwar Minesweeper, AM 421 Class.

modify them for use for laminated structure.

A laminated member is of necessity at a relatively low moisture content since wood in order to be successfully glued must be at a moisture content of 15% or less. A solid beam on the other hand is very difficult to dry and will be used at a moisture content approaching that of green timber. Since table 5-2 was predicated on large timbers of high moisture content, and since dry wood has stronger properties, an increase of table 5-2 values could be safely assumed for laminated beams.

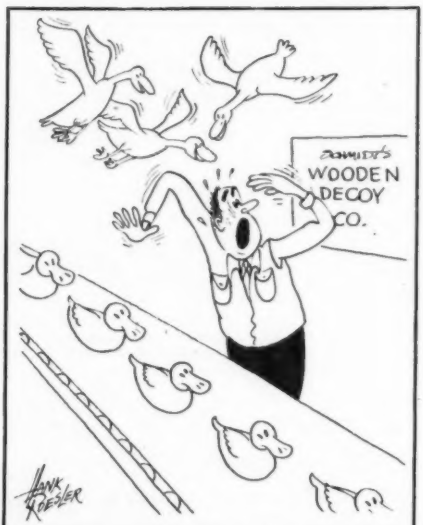
A conservative figure for this increase of strength was determined as 25%. Furthermore, laminating reorients defects and reduces the effect of variability normally found in a single stick of wood. This reduction in variability of strength was good for another 20% increase in allowable stress.

Other increases in allowable stress were based upon wood's natural increase in resistance to damage under loads of short duration. For loading of limited duration such as under conditions of dry docking or internal flooding, allowable stresses were increased 25%. For loading of short duration such as caused by waves, allowable stresses were increased 75%. A shock load such as caused by underwater explosion or gun reaction allowed an increase of stress of 100%. These percentages are cumulative. Thus a laminated Douglas fir deck beam would be designed to an increase of 120% (20 + 25 + 75) or 4400 p.s.i. instead of the 2000 p.s.i. of table 5-2 of the manual.

A further increase of allowable load was determined as feasible in the case of definitely known loads such as a hydrostatic head upon bulkheads. This increase was selected as 50% and was in effect, a reduction of safety factor based upon known loading conditions. Since table 5-2 stresses included a safety factor of about 2¼ for long time loading, or 4 for short duration loading, it was reasonable to reduce these factors by 50% where the necessity for safety factor was not critical.

(To be continued)

This article was originally prepared for the Chesapeake Section of the Society of Naval Architects and Marine Engineers at the February 1955 meeting. It is reprinted with permission.



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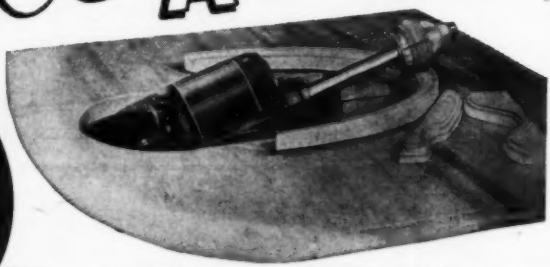

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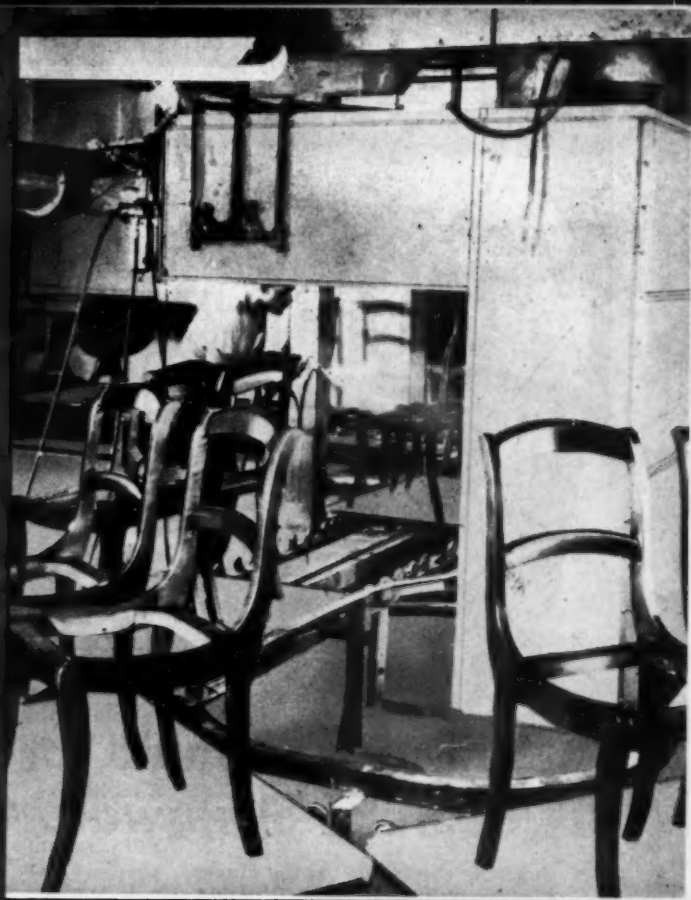

FINISHING SECTION

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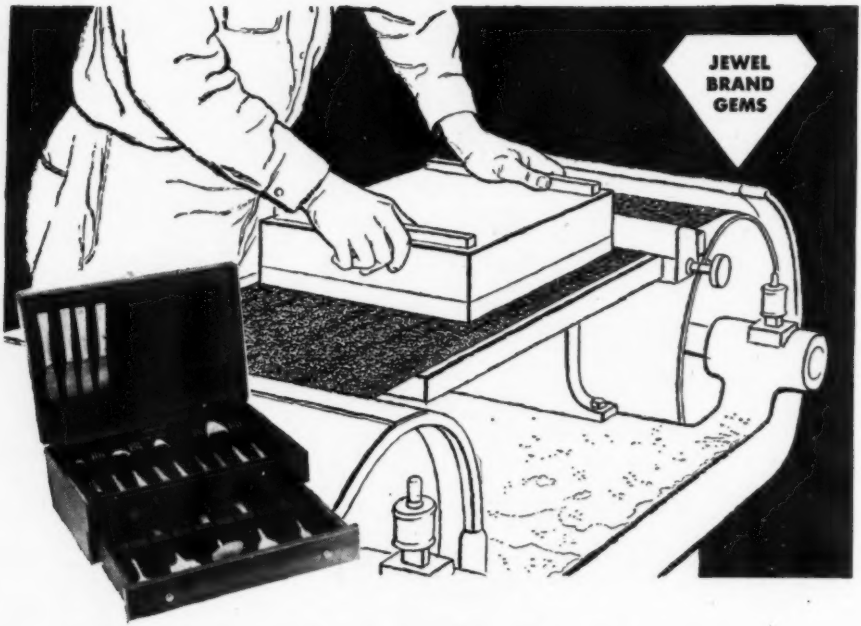

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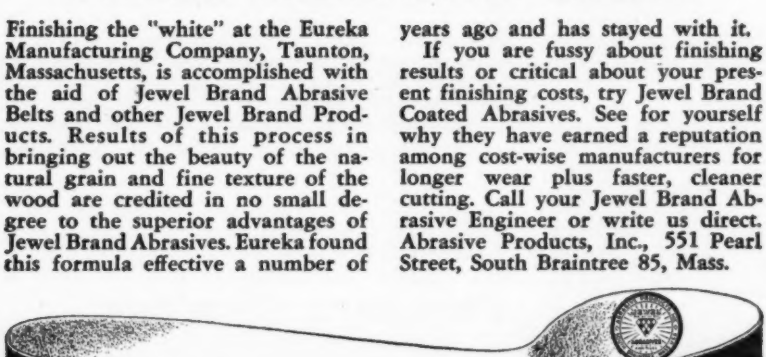

FURNITURE FINISHING

Part 8

By

HAROLD B. GATSLICK

THE final quality of a finish is dependent to no small extent upon the proper development of each succeeding finishing step from the bare wood to the application of the final topcoat. Sealers effectively serve many purposes and may be employed at different times during the finishing operation. The terminology is quite specific depending upon the time of application.

In an over-all consideration, the sealer primarily prevents absorption of materials from one coat to another and allows for maximum adhesion by offering a smoother surface for the subsequent coating. The sealer used on bare wood is generally called a size; the sealer used between the stain and filler coat a washcoat; whereas the sealer employed following the filling operation may be called a sealer, prime coat, and lacquer or varnish undercoat.

It is generally agreed that glue sizing and washcoating are desirable to obtain an optimum quality finish, whereas the sealer is an absolute necessity for obtaining an acceptable finish. With perhaps fillers being the exception, sealers have proved to be one of the weakest links in the present-day finishing systems.

Sealers may be divided into three broad groups. These are: lacquer sealers, varnish sealers and shellac sealers. The primary function of a sealer is to seal the surface of the wood, thereby preventing absorption of succeeding finish coats. Other functions include: (1) sealing in the filler; (2) blending or moderating the stain; (3) stiffening minute wood fibers to allow for sanding to a smooth surface for subsequent coats; and (4) allowing a maximum bond between any preceding or succeeding coat.

If too heavy a sealer coat is applied, swelling of the filler and brittleness in the final finish may result.

Most lacquer- and shellac-type sealers dry to sand within 30 minutes to one hour, whereas varnish-type sealers generally require overnight drying prior to sanding. Some varnish sealers are force-dried in two to three hours at 130°F.

Prior to application of the first topcoat, the sealer should be lightly dry sanded with 5/0 to 7/0 abrasive paper either manually or by machine. If sanding is excessive, the sealer film may be broken and a poor color effect in the final finish often results. It is imperative that sanding dust be removed by air spray and that the surface be cleaned

with a tack rag if a quality finish is desired.

A colored or tinted sealer occasionally is used to reduce the tendency of filler graying. Simulation of a glazed effect is sometimes achieved by using a color sealer.

GLUE SIZING

Glue sizing has two primary advantages. It stiffens surface fiber walls so that they can be cleanly cut off by a light sanding and thereby not protrude into or through the finish. Secondly, glue sizing will tend to make the surface more homogeneous in its absorption qualities thereby allowing for a more uniform staining. Glue sizing is applied with a soft cloth or sponge, by spray, brushing, and occasionally by use of a coating device such as a glue spreader. Glue size consists of animal hide glue with 8 to 20 parts of water.

Glue sizing also is recommended when filler is to be applied to bare wood to prevent filler oils from bleeding into the wood and to provide for a simpler padding operation. In sizing it is desirable to apply only a sufficient quantity of size to affect grain raising, holding the fibers in place and drying in a minimum time. If excessive water is used, a long drying time will be required and if the hide glue is used in excess, difficulty will be encountered in sanding the glue-sized surface. A warm glue size is recommended for better penetration and faster drying.

WASHCOATS

A washcoat serves primarily to prevent discoloration of the wood by the oils and resins in the filler. It also preserves the clarity of the finish, permits easier wiping of the filler and provides a smoother uniform surface for filler application.

Washcoats usually consist of lacquer or shellac sealers at 5% to 10% solids. Some finishers seem to prefer shellac as they feel that it wipes easier than lacquer. A washcoat is imperative over a water stain and is recommended over non-grain-raising stains to give the greatest clarity to a finish. Occasionally, a small amount of non-grain-raising stain is added to the washcoat to produce a more even or brilliant color, thereby making the washcoat effectively a toner.

Perhaps the most important economy derived from washcoating is in simplifying the filler wiping operation. Since a certain amount of hand wiping is required, any operation that will reduce or minimize manual labor will tend to reduce costs.

Adding a washcoat reportedly increased one firm's production almost 100% and gave a net saving of three men's time.

Some finishers recommend the use of shellac washcoats. They point out that the alcohol in the shellac washcoat forms a constant boiling mixture with any moisture that might be present in the stain and is thereby removed, which is not true in the case of sealers or lacquer washcoats whose solvents are immiscible with water. However, a shellac washcoat dries slower than a lacquer washcoat and does not offer sufficient advantages to be extensively used today with the fast finishing schedules normally required.

Washcoats are occasionally used on bare wood when it is desired to color the wood pores with a minimum stain-

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ing of the flake or surface of the wood. Washcoats not thoroughly dried before the application of filler may cause lack of clarity in the finish by picking up color from the filler, will cause poor filling and poor cleanup of filler, and also may affect bubbling and blistering in the topcoats.

SHELLAC

Shellac is the oldest prime coater employed and today is still used as a sealer under oil varnishes. Shellac is an alcohol-soluble gum or resin produced in three forms: orange, white and dewaxed. The shellac gum is processed excretion of the lac insect (Coccus lacca, Tachardia lacca and Carteria lacca) imported from Bengal, Thailand, China, Ceylon, Burma, Pakistan, India and the Malayan Archipelago.

Orange shellac is used on darker woods, white shellac on lighter colored woods and dewaxed shellac where a maximum of clarity and paleness is required. Shellac offers good sealing properties and is fairly fast drying, but it is difficult to sand and does not provide good adhesion with hardwoods such as oak, maple and birch. The use of dewaxed shellac will minimize the sanding difficulty.

The resin concentration of shellac is designated by the "cut" which is the number of pounds of dry shellac dissolved in a gallon of denatured alcohol. Cuts of four and one-half pounds are commonly used as sealers in production varnish finishing schedules. A two-pound cut or less is recommended if the shellac is to be used in a lacquer system.

Cheaper grades of shellac, called substitute shellac or sub-shellac, are manufactured by adding cheap rosin, manila gum and other resins, but these materials generally are restricted to lower quality work where it is essential to cut costs by sacrificing the quality of the finish.

Synthetic shellacs are now being developed using alcohol-soluble modified synthetic resins. It is reported that these materials closely simulate the desirable qualities of shellac and, in some cases, are superior and that their use for washcoating and other finishing is expected to grow.

A mixture of shellac and lacquer known as shellac-mixing lacquer has been used for washcoating. A representative formula would be one part mixing lacquer to three parts of four-and-one-half-pound cut shellac and two to three parts of denatured alcohol. This type sealer brushes easier, has better flow and sanding qualities, offers greater moisture resistance and adhesion, and dries faster than a shellac

"All right, Miss Twigum, go get your coffee!"

sealer. It is comparable to straight shellac in toughness and holdout. Because of incompatibility, lacquer sealers are not recommended for mixing with shellac.

SHELLAC APPLICATION

Shellac may be applied by brush or spray. In brushing, a soft flat-bristled brush is recommended and application should be along the grain in rapid strokes.

Shellac polymerizes at an exceedingly fast rate, consequently, little, if any, rebrushing can be affected.

In application, very thin coats are recommended. The flow characteristics of shellac invite "orange peel," a pebbled surface condition, if heavy coats are employed. A light sanding with 5/0 or 6/0 abrasive paper should follow the recommended drying period. Sanding dust should be removed by air and tack rags to give a clean, smooth surface for maximum adhesion of the topcoat.

LACQUER SEALERS

Lacquer sealers are extensively employed as the prime coat in production furniture finishing. Lacquer sealers consist of nitrocellulose or other cellulose esters or ethers, resins and plasticizers, sanding agents such as zinc and calcium stearate dispersed in a suitable solvent system. Film-forming solids range from 12% to 21%. Generally, low non-volatile content provides better results.

An excess of sanding agents may produce a fast-drying, sandable sealer coat. However, an excessive amount of sanding agents may also result in a brittle finish lacking adhesion. When two or more finish coats are to be applied, a medium-to-low solids sealer is recommended for optimum quality, whereas a medium-to-high solids sealer is suggested where only one finish coat is to be applied over the sealer.

Because they are designed for quick drying and incorporate sanding agents, sealers are recognized as a weak link in the finishing system. Better toughness and mar resistance can be obtained by formulating the sealer for slower drying, thereby allowing better penetration at a sacrifice of sealing properties or hold-out.

Of the many lacquer sanding sealers available, the most common types are the high-viscosity sealer, the hard-resin, the oil, the alkyd and various penetrating sealers.

The high-viscosity type generally is a low-cost item because it is formulated with high-viscosity nitrocellulose or film scrap and necessarily must have low solids. The high-viscosity type has good sandability, good flow and speed of drying, but is lacking in toughness and build qualities.

Maleic resin is the base resin in the hard-resin-type sealer. This sealer generally is well suited for fast drying schedules, offers good adhesion, build, fairly good cold check resistance and develops the color of the finish.

The oil-type sealer is based on oil-type plasticizers rather than resinous materials. This sealer lends itself in formulation to give good-to-excellent sealer properties under lacquer, varnish and urea-alkyd baking finishes.

Alkyd resins have been incorporated into sealers to provide maximum cold check resistance. This can be accomplished, but some sacrifice in sanding

properties and drying time must be accepted.

The penetrating-type lacquer sealers are formulated with relatively low-temperature melting synthetics such as the vinyls and offer excellent adhesion, cold check and mar resistance. However, sandability and speed of drying is sacrificed and the material cost increased. Penetrating-type sealers also develop the color of the finish better than conventional sealers.

A typical lacquer sealer formulation is shown in Table I. This formulation should be sprayed at 18.5% solids and should be ready for sanding in 20 minutes. The nitrocellulose gives the film strength, the maleic gum fortifies the nitrocellulose, the raw castor oil bodies and plasticizes and the dibutyl phthalate is a plasticizer for the nitrocellulose. The solvents should be a balanced mixture of esters, alcohols, ketones and latent solvents such as toluol or xylol. Lacquer film-forming materials, resins, plasticizers and solvents are discussed in detail in a later section of this series. The metallic soap or lubricant added to the sealer formulation provides slippage or lubrication to the surface of the film so that sanding can be easily accomplished.

LACQUER SEALER APPLICATION

Lacquer sealers may be brushed, dipped or sprayed, although the latter technique is normally employed. Generally manufactured at ready-to-spray viscosity, they usually are sprayed at pressures ranging from 30 to 100 pounds. Fluid pressures of 10 to 25 pounds and air pressures of 50 to 65 pounds normally yield good application results. It is important that forced-drying fillers be allowed to cool to room

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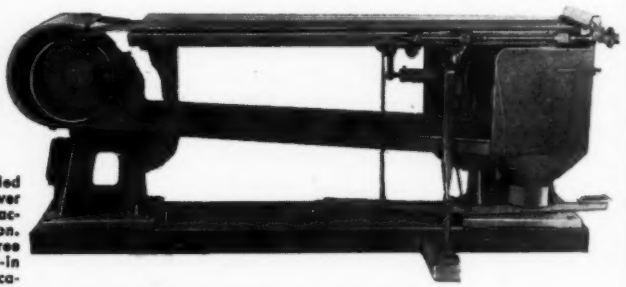

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The Oakley Co. SINCE 1924 — BRISTOL TENNESSEE

temperature prior to sealer application or blistering may result.

In spraying, a wet even coat generally is applied, avoiding excessive spray to prevent filler solvation. Lacquer sealers may air dry in 30 minutes to 4 hours but overnight drying is recommended to insure maximum sandability. Forced drying may be affected in 10 to 20 minutes at 110°F to 120°F.

After drying, the sealer coat should be sanded with 5/0 to 7/0 abrasive paper. As with shellac sealers, the abrasive dust should be completely removed before application of the topcoat.

If an excessive amount of sanding agent is included in the formulation, poor adhesion and a brittle final finish is the usual result. A minimum of sanding agent can be employed if the sealer is force dried. A flash period of ten minutes prior to force drying and a ten-minute cooling period prior to sanding reportedly give optimum results. A flash period is the preliminary drying which allows for initial setting of the film.

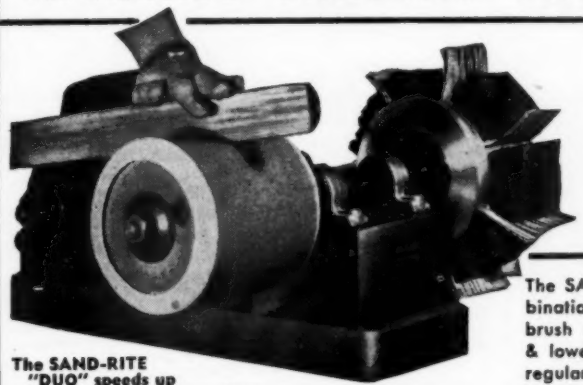
Lacquer sanding sealers can be applied by the hot spray method, provided that the spraying temperature is not higher than the melting point of the sanding aid in the sealer formulation. For example, a sanding sealer formulation containing zinc stearate should not be sprayed above 140°F.

VARNISH SEALERS

Natural and synthetic varnish sealers, other than shellac, are used in some systems. Generally they are slower drying but give improved toughness and adhesion.

Varnish sealers are relatively inex-

INCREASE SANDING PRODUCTION



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Dept. W., 226 W. Schiller St.
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pensive. They are normally applied at 30% to 35% solids and can be force dried in one to two hours at 150°F. Air drying of varnish sealers requires from 12 to 24 hours.

Urea-alkyd low-temperature baking varnishes require a sealer low in stearate, since the stearate neutralizes the acid catalyst used to convert the urea resin. One technique for eliminating this problem is to use a clear lacquer coat between the lacquer sealer and the urea-alkyd varnish.

Current requirements for water white finishes have resulted in the formulation of water white sealers with some sacrifice in sanding properties in favor of improved color and color retention.

With the increased use of hot lacquers, the demand for greater build in the sealer has called for a greater percentage of solids in the sealer formulation. However, high-solids sealers generally have shown poor sandability and relatively poor cold check resistance as well as only fair adhesion and toughness. To date, the most practical solution to this problem has been the double coating of low-solids sealers. In this type of operation, a short drying period without sanding the primary seal coat has given satisfactory results.

Penetrating sealers based on polyvinyl butyral and other vinyl compounds have been developed that allow for good adhesion without reducing desirable sanding qualities.

PROBLEMS

The technique of application and control of materials offers the most difficulty with sealers, and research and development are needed on application

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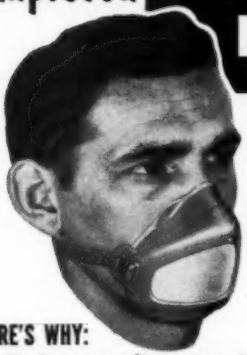

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techniques as well as materials and formulation.

One company reported that in finishing television and radio cabinets the major sources of trouble have been as follows:

Glue Sizing:

1. Uniform absorption of various grain densities.
2. Rate of drying.
3. Stain pickup.
4. Sandability.

Sealer:

1. Sandability.
2. Adhesion.
3. Lacquer holdout.
4. Build.
5. Rate of drying.
6. Light stability.
7. Flexibility.

The metallic soaps incorporated in sealers to facilitate sanding cause undue softness and poor film strength as well as poor adhesion between sealer and topcoat. Since abrasive paper represents a substantial part of the total finishing cost, many finishers have their suppliers of finishing materials use maximum quantities of these sanding lubricants which many times result in greater monetary losses than would have been encountered by using a little more abrasive paper. A better ingredient than those presently employed is desired to promote better sanding properties in lacquer sealers.

Undried Film:

(The following factors may cause poor sanding due to an underdried film.)

1. Too much thickness.
2. Too slow a solvent.
3. Poor ventilation in the drying room.
4. An excess of plasticizer in the formula.
5. Presence of wax on the surface.
6. Absorption of oil or plasticizer from an underdried filler.
7. Too low a temperature to permit normal release of solvent.
8. Use of resins for poor solvent released (low melting point).
9. Improper solvent balance causing rapid drying of the film surface (skinning).

Trapped solvents occasionally cause blistering of the sealer coat. One technique employed to overcome this problem is to spray a very light coat, or fog coat, on the piece and then immediately follow with a full flowing spray coat. The trapped solvents in the filler are

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Table 1—A TYPICAL LACQUER SEALER FORMULATION

Material	Per Cent By Weight
Nitrocellulose regular soluble ½-second	50
Maleic gum	30
Raw castor oil	10
Dibutyl phthlate	10

With solvents and latent solvent to reduce solids to 18.5%. Add 5% zinc stearate to the total mixture—solids plus solvents.

By permission from "Finishes for wood" by R.E. Prince. "Paint, Oil and Chemical Review," May 1951.

allowed to escape before the full flowing coat is applied.

Shellac sealers may be the cause of pinholing in the final finish. Alcohol, which is used to dissolve the shellac, is frequently a solvent for the paste wood filler which tends to absorb the alcohol and may allow it to volatilize after subsequent finish coats have been applied.

Some manufacturers use sanding sealers as a finishing lacquer which give the appearance of a rubbed finish. Since they are subject to scratching white, a final coat of liquid wax is applied. Too heavy a wax application may soften and/or precipitate the nitrocellulose.

The next article in this series will be on varnish and synthetic topcoats.

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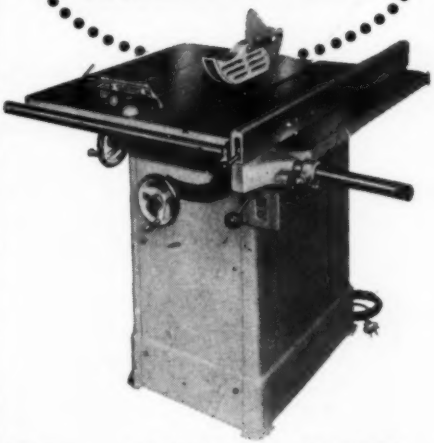

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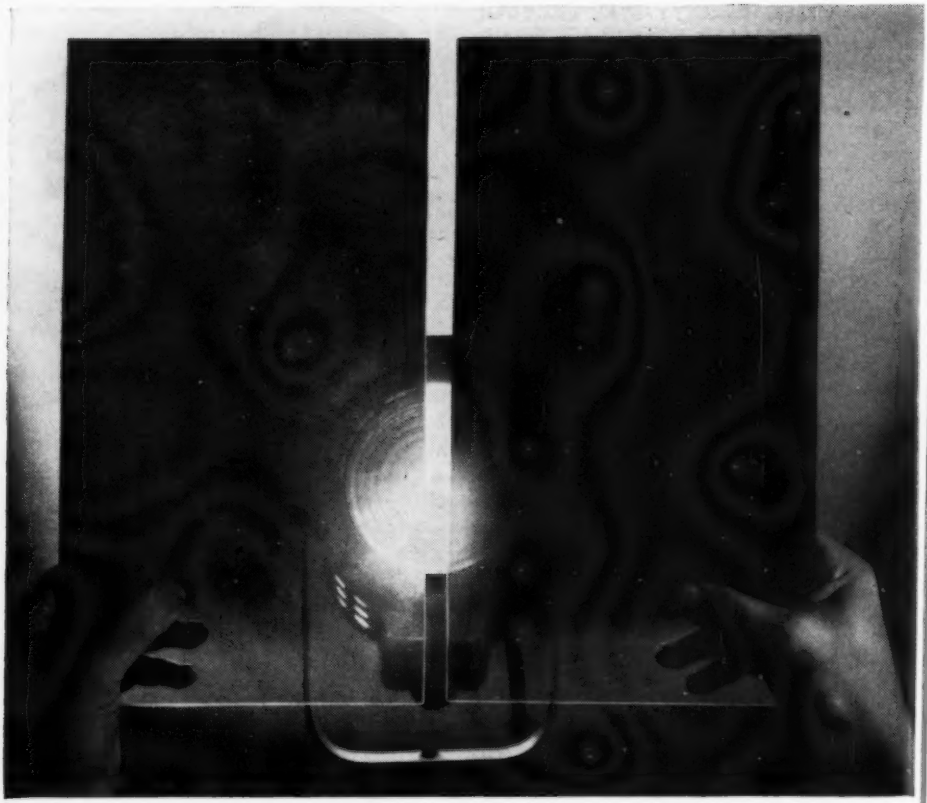
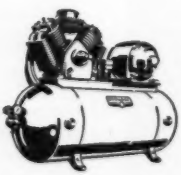


***Paint applied** to its maximum film thickness by the usual spray method (cold) looks like this in front of a powerful spotlight. Note coverage.*

***Same paint** applied by the DeVilbiss Hot-Spray method produces far greater coverage with a heavier coat, as the glass panel on right shows.*

Spray Guns

Air Compressors



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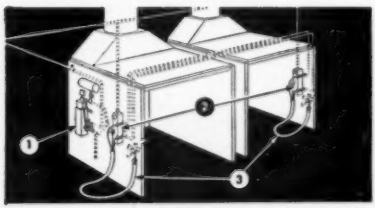
This superior finishing method saves up to 50% in material and labor costs; may be used on all types of products – from autos, furniture, and appliances to military tanks. For facts on how much the DeVilbiss Paint Heater can save *you*, call your DeVilbiss supplier!



DeVilbiss Hot-Spray system is foolproof; adapts to multiple gun hook-ups. Hot water from master heater (1) heats paint in exchangers (2); heat-jacketed hose assemblies (3) keep paint hot right up to guns, assuring uniform viscosity at all times at each gun.

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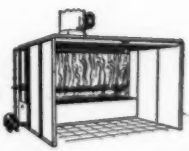

Spray Booths

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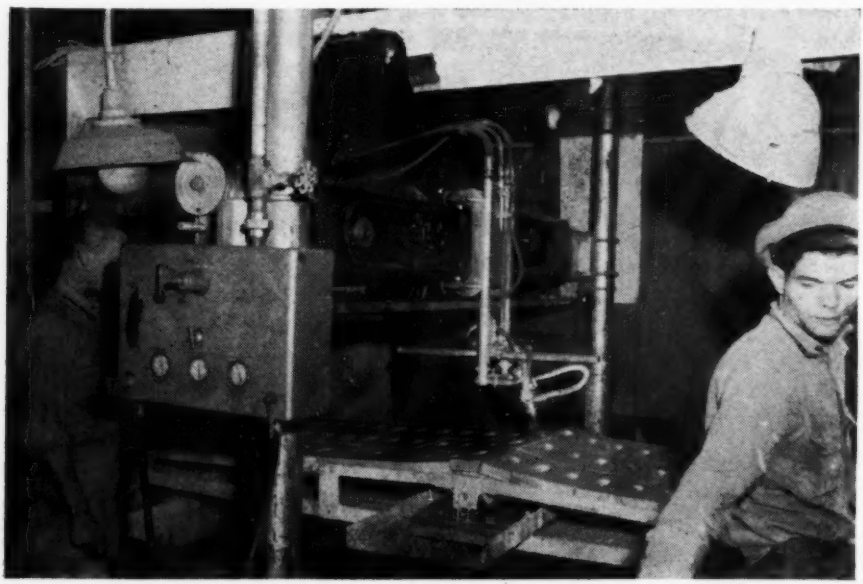
DEVILBISS HOT SPRAY

Finishing Coca Cola Boxes

By O. M. Lee and H. R. Rothenberg

THE bright yellow boxes seen all over the world on Coca-Cola trucks, for carrying 24 "Coke" bottles, are among the most familiar sights of our times.

The finish used must be glossy, tough, and possess weather-resistance. These boxes are subjected to some of the most abusive conditions any finishes must withstand, and, in addition, because of the tremendous quantity used, must be economical. The Miller Mfg. Co., in Richmond, Va., is one of the world's largest producers of these cases. Manufacturing facilities are geared to economy, quality and quantity in production. All lumber is cut locally and a large percentage cut by Miller's own sawmill. Power used in manufacturing is generated from their own boiler, which is run on the shavings. (The shavings are separated from the sawdust, which is sold.) The lumber is planed, then cut on saws to length.



Spraying the box ends. Note conveyor which moves under spray gun.

View of box parts on conveyor line. Spray booth is on right, conveyor enters oven at left.

The box ends and sides are cut separately, shaped, sanded and stacked on large hand trucks preparatory to finishing.

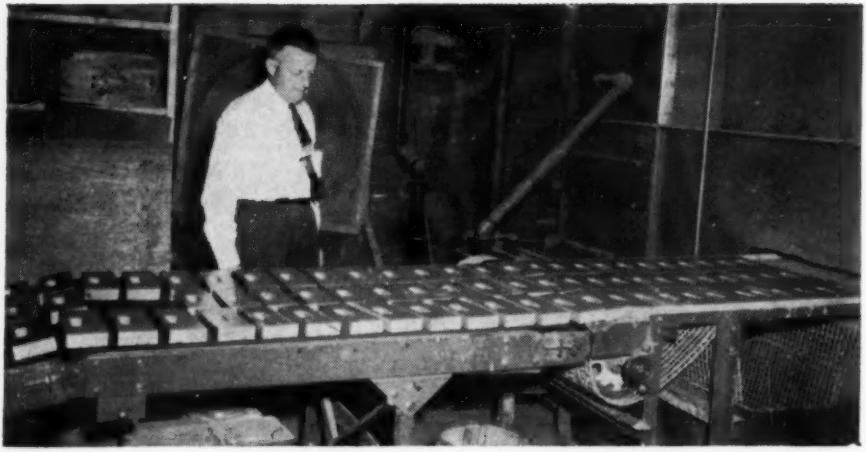
Prior to the inception of Miller's new finishing system, installed about two years ago, the box ends and sides were stacked and fed through an automatic belt to a constant-position automatic spray gun. Production was at the rate of about 2000 finished boxes per day. Labor costs and paint costs were high, due to much individual handling, and paint overspray losses. O. M. Lee, production manager for Miller, designed the new finishing system, which was built to their specifications. Since its inception, savings of over 50% in labor and 33% in material, in addition to production increases of 150%, have been accomplished.

The finishing system consists of a flat wire belt conveyor about 100 feet long, which passes through the spray booth and a low temperature oven, at a speed of 600 feet per hour. The booth is water-wash type: the single spray gun used is an automatic reciprocating spray gun, which travels at the rate of 288 feet per minute. It has an automatic cut-off tied into the conveyor belt movement, resulting in large paint economies. About 70 box ends or 50 sides are sprayed per minute; a total potential capacity of 33,600 ends or 24,000 sides per day may be finished with this unit.

The box sides and ends are loaded by hand onto the conveyor belt, which then travels into the spray booth.

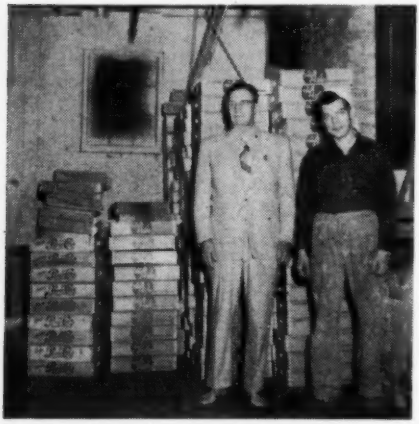
The paint is a high-solids gloss lacquer enamel, formulated for one-coat coverage over the unfinished wood. It is supplied at 100 sec. Ford Cup No. 4; one gallon covers about 150 completed boxes. The paint is sprayed from 30 gal. pressure tanks, agitated constantly, with 40-45 lbs. on the tank and 65-70 lbs. on the gun.

After being sprayed, the box sides and ends travel for an air-dry period of four minutes, then are force-dried in the oven mentioned previously for six minutes at 125°F. The conveyor travels along the floor after leaving the spray booth, descends to the ceiling of



Inspection of finished box ends by O. M. Lee, Superintendent, Miller Mfg. Co.

the floor below for the oven phase, thus conserving valuable floor space; then descends to the box assembly area, where the sides and ends are taken off the conveyor and strapped automatically.



The finished products, showing Coca-Cola, Pepsi Cola, and Tru Ade boxes. Persons shown are: J. M. Berry, sales manager, Wood Finishes Div., J. Landau Co., and J. Stephens, finishing foreman, Miller Mfg. Co.

The entire time elapsed between the spray gun and the start of the assembly process is ten minutes. Assembly and strapping is done automatically. A printing machine stamps the familiar trade marks of the soft drink companies on the sides and ends of the boxes, and the completed boxes are ready for shipment within hours.

In addition to producing Coca-Cola boxes, the company also manufactures boxes for Pepsi-Cola, Tru-Ade, Dr. Pepper, 7-Up, and other soft drink manufacturers. The same finishing system is used, except, of course, for the particular colors which serve to identify the products in the mind of the American public.

When the stranger pulled up to the curb, the first person he encountered was the village dim-wit. "I'm looking for an old friend," he said. "Do you by any chance know a fellow around here with one eye named George Simpson?"

"I can't say that I do," replied the dim-wit. "What's his other eye named?"

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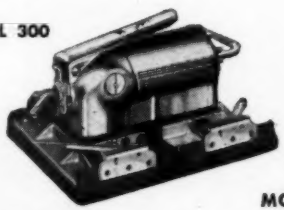

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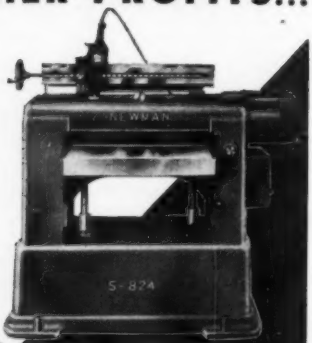

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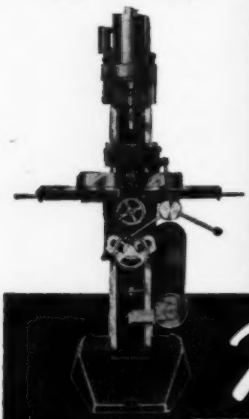

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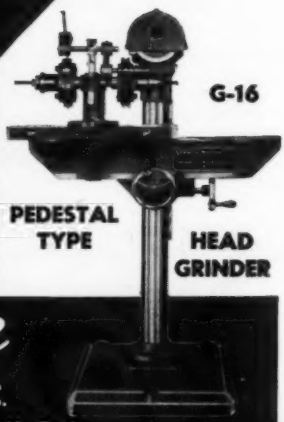

G-16 PEDESTAL TYPE HEAD GRINDER

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INDUSTRY NOTES

NEW WAREHOUSE

E. F. Davis, Sr., president of The Davis Plywood Corporation, with home office in Cleveland, has announced the opening of their new enlarged warehouse at 1222 Camden Ave., S.W., Canton, Ohio.

Davis Plywood has maintained a warehouse in Canton and has been servicing the dealers in that area for the past three years. The new warehouse has over twice the floor area of the former location and affords better service due to the floor level being at truck height.

The Canton operation is managed by Harold Dunlap, and Morie Orivs, who is well known by the dealers in the Canton area as office salesman. The new warehouse superintendent is Ed Evcic, who was formerly with Davis at Cleveland, Ohio, and is well versed in the handling and storing of plywood.

ILLINOIS JOINS TREE FARM PROGRAM

Illinois is the 39th state to adopt the American Tree Farm System of private woodland management. In formal dedication ceremonies held at the Sinnissippi Forest, Oregon, Ill. the Lt. Gov. John Chapman, awarded Tree Farm certificates to 17 "chapter members" of the Tree Farm system in Illinois and predicated it would grow as more and more landowners realize the value of growing timber as a crop.

GUSTAFSON & SCOTT SELLS CUTTER DIVISION TO WISCONSIN KNIFE

John E. Rice, president of Gustafson & Scott Mfg. Company of Chicago, Ill., has announced the sale of the Cutter Division of his company to the Wisconsin Knife Works of Beloit, Wis. Mr. Rice stated that the rapid expansion in the sale of new, used and rebuilt machinery over the past years necessitated this action, and they can now devote their entire efforts, and plant facilities, to the sale of woodworking machinery and contract rebuilding.

The Gustafson & Scott firm has long been an important factor in the manufacture of knives, cutterheads, and other special woodworking tools. The company was founded in 1887 by P. E. Gustafson and was later incorporated by his son, Oscar Gustafson, and George S. Scott. Patents were issued to the company covering its design of round safety type cutterheads. The company manufactured a complete line of round and square cutterheads, vise grip heads, slotted knives, thin knives, shaper steel, etc.

The Wisconsin Knife Works will be able to give service to all Gustafson & Scott customers without delay. All inventories of finished merchandise and work in process together with all the tools, jigs, fixtures, drawings, and records have been transferred to the modern plant of the new owner in Beloit, Wis.

APPOINTMENTS

E. J. Weller, manager of tool sales, Carboloy Department of General Electric Co., Detroit, has been named manager of a newly established carbide products design engineering design.

Reisen Hardwood Lumber Co., Union, N.J., announces that **Albert J. Lacy, Jr.,** is now with the firm. He will deal with purchase and sales of both domestic and foreign woods.

DeWalt Inc. has named two vice-presidents. They are **Truman Jones** and **Edward W. Forth.** Formerly general sales manager, Jones has been named vice-president in charge of sales. Forth has moved from the position of general superintendent to vice-president in charge of manufacturing.

Edward W. Forth

Truman Jones

Albert W. Lange has been appointed sales representative in the New York City area for the industrial division of Henry Disston & Sons, Inc., Philadelphia.

The New York Paint, Varnish & Lacquer Association has named **Bertram F. Ames** as chairman of the industrial product finishes committee. Ames is general sales manager of Maas & Waldstein, Newark, N.J.

Promotion of **Donald R. Guthrie** to general manufacturing manager of the coated abrasives and related products division has been announced by Minnesota Mining & Manufacturing Co.

To make a long story short, don't tell it.

No. 45-20-18

THOUSANDS OF PROBLEMS HAVE BEEN SOLVED BY

DOIG AUTOMATIC NAILERS

Standard Doig Features

1. Anti-friction bearings.
2. Three separate motorized drives.
3. Nail feeder to handle nails from 1 to 3 inches without additional parts required.
4. Nail feeders to give 12 separate nailing combinations.

NEW FEATURES

A. Wheel on left allows operator to adjust back gage from operating position.
B. Solenoid trip permits operator to trip machine at any position desired.

WRITE TODAY. WE INVITE YOUR REQUESTS FOR FULL DETAILS

WILLIAM S. DOIG Inc.

DEPT. 312 — 894 MANHATTAN AVE., BROOKLYN 22, NEW YORK

BUILDERS' SHOW

The largest display of building materials, equipment and services on record and a streamlined presentation of the latest developments in home building are in store for delegates to the Annual Convention and Exposition of the National Association of Home Builders in Chicago, January 22-26, 1956.

Exhibits will be located not only at the Conrad Hilton and Sherman Hotels, as in the past, but also at the Chicago Coliseum. According to Paul S. Van Auken, convention-exposition director, this expansion of exhibit facilities will make it possible to accommodate about 450 exhibitors compared to 344 at the 1955 show. The number of exhibit spaces has been increased by one-third.

Persons who are not NAHB members should write direct to Convention Headquarters, National Association of Home Builders, 111 West Jackson Blvd., Chicago 4, Ill.

DOOR PLANT OPENED

The Wisconsin Door Company announces the opening of a new flush door plant in Port Newark, N.J. Shipments are now being made from this new facility.

The new plant is designed to give east coast jobbers an advantage in freight rates and therefore lower costs for the nationally advertised Wisconsin Knight flush doors.

Sales office for the Port Newark plant, as well as for the Livonia, Mich., main factory, is located at 10101 Lyndon Ave., Detroit 38, Mich. The Wisconsin Door Company is one of the nation's largest producers of flush doors, supplying a complete line in several wood faces.

TYEE TO REPRESENT SARANAC IN NORTHWEST

A new firm, Tyee Machinery Co., at 1924 First Ave., South, Seattle, Wash., has been appointed exclusive northwest

more eased-edge lumber at less cost with DISSTON PHILBRICK® CUTTER HEADS and KNIVES

Sounds unbelievable, doesn't it? Yet, that's the production record of one set of Disston knives—thanks to the superior edge-holding qualities of Disston steel. Disston knife design allows free discharge of chips—eliminates over-loading and clogging—makes possible maximum feeds.

Why not capitalize on the tremendous demand for eased-edge lumber by using low-cost, high-production Disston Philbrick Generated Type cutter heads and Disston knives in your plant. Order them from your Disston distributor, or write:

HENRY DISSTON & SONS, INC.
1195 Tacony, Phila. 35, Pa.

Other factories and branches:
Seattle, Wash.; Chicago, Ill.; Toronto, Ont.

36 million feet of stock from one set of knives!

Long-Life Disston Knives Cut Costs

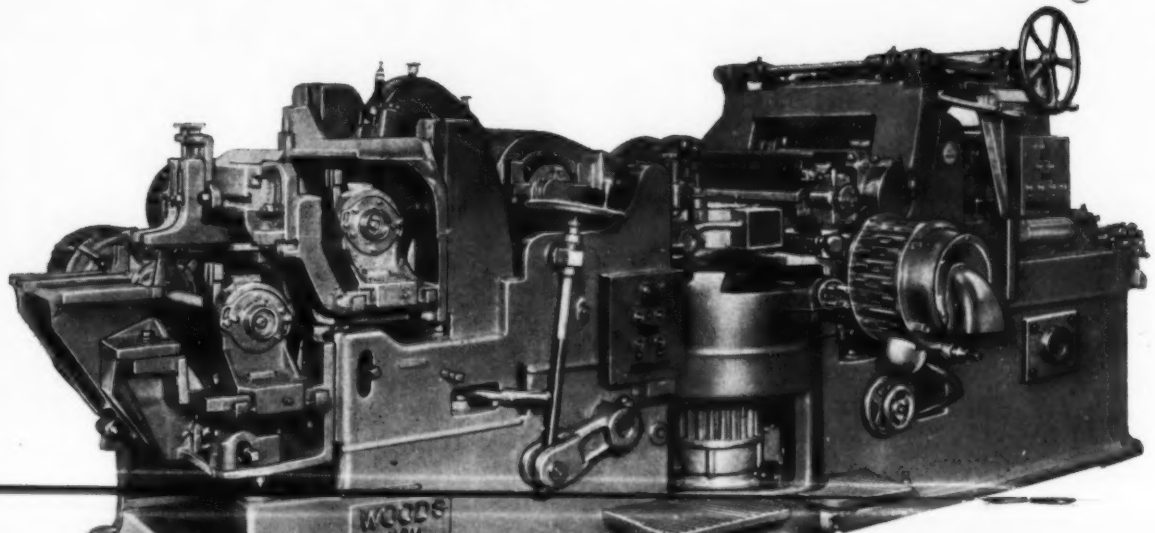
Notice the new and worn-out knives at left and how the latter retains its pattern and wears right down to the end.

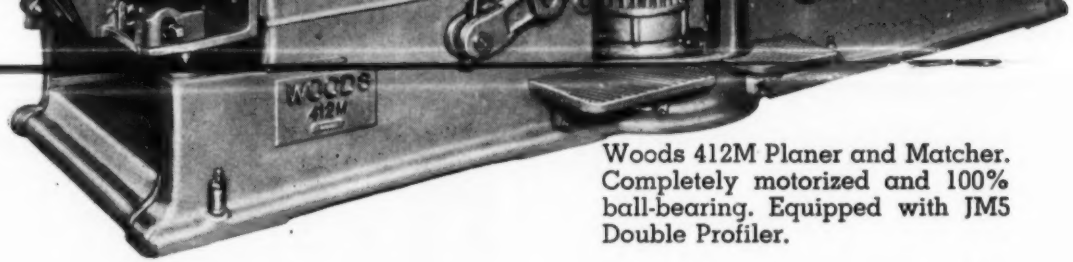
Serving the Industry Since 1852

It's Matchless!

This PLANER and MATCHER

built by "The Planer of Woods"®





Woods 412M Planer and Matcher. Completely motorized and 100% ball-bearing. Equipped with JM5 Double Profiler.

Among the Leaders in the Industry that depend upon the "Matchless Performance" of the Wood's 412 Planer and Matcher are . . .

GURDON LUMBER COMPANY
Gurdon, Arkansas

ORANGE LUMBER COMPANY
Orange, Virginia

MODUC LUMBER COMPANY
Klamath Falls, Oregon

SALMON RIVER LUMBER COMPANY
Riggins, Idaho

SOUTH PORTLAND PLANING MILL
South Portland, Maine

WILLIAMS LUMBER COMPANY
Wilson, North Carolina

Send for New Planer and Matcher Bulletin

S. A. WOODS MACHINE CO.

27 DAMRELL STREET

BOSTON 27, MASS.

Branch Offices: ARK., Little Rock CALIF., San Mateo N.Y., Mount Vernon
N.C., Greensboro ORE., Portland TENN., Memphis VA., Richmond
Canadian: B.C., Vancouver, Akhurst Mchy. Co. ONT., Galt, Canada Mchy. Co.
Export Dept. United States Machinery Co., 90 Broad St., New York City

dealer for Saranac Machine Company's line of wire stapling and corrugated fastener driving equipment, including industrial wire stitchers.

L. Y. Evans and Neale Warne, principals of Tyee, combine years of previous experience in Saranac sales work. They will serve Washington, Idaho, Montana and the territory north of Eugene in Oregon.

SCHOOL OF SPRAY PAINTING

Application to attend the November or December classes of Binks free School of Spray Painting may still be made by writing to the Binks Manufacturing Co. at 3122 Carroll Avenue, Chicago 12, Ill.

Dates for the two remaining Fall sessions are November 7 through 11, and December 5 through 9. There is no charge for attending this school. Students pay only for their living accommodations and their transportation to and from Chicago.

The one-week courses provide instruction in the proper use of the latest in spray painting equipment, both manual and automatic. Students learn how to get the most productivity out of the equipment which they or their companies now have.

U. S. PLYWOOD TRANSFERS DIVISION

United States Plywood Corporation has transferred the sales headquarters of its Flexible Materials Division to Louisville, Ky. Sales of this division were previously supervised at the company's New York office.

The move is being made to coordinate more closely the sales and manufacture of Flexwood, flexible wood paneling for walls, and Kalistron, sheet plastic material in a variety of colors, used for walls, upholstery and luggage. Both these materials are produced by U. S. Plywood in Louisville.

FASTER HOLE PRODUCTION

with Commander MULTI-DRILLS

• Drills up to 8 Holes at 1 Stroke • Fits Any Drill Press
• Adjustable to Any Hole Pattern
• Quickly Pays for Itself Many Times Over

● Commander MULTI-DRILLS are instantly and easily adjusted to handle any hole pattern within a 9" circle. Standard Extension Spindles will increase working area to 22½". Minimum center distances close as ½". Compact in design, ruggedly built, Commander MULTI-DRILLS are making BIG Savings in time and labor for wood-working plants everywhere. Special adaptations available.

Commander MFG. CO. 4222 W. KINZIE STREET CHICAGO 24, ILLINOIS

SPA RESEARCH

Lumber's own "atomic age" may be just around the corner.

The Southern Pine lumber industry has placed into motion the machinery for a research program. Judging from the possibilities that already have been expressed on the subject, this research may reach hundreds of years into the future, and could even harness the atom to lumber manufacture.

A second prospect—and one of immediate interest to the consumer—is the development of new and improved home building techniques aimed at substantial cost reduction, and the creation of new and better materials for use in the home construction field.

As the first step, the recently organized Research and Development Committee of the Southern Pine Association, chairmanned by Earl M. McGowin, of the W. T. Smith Lumber Company, Chapman, Ala., will review and coordinate the results of research already done. As the second step, the committee plans to initiate specific research projects and development directed toward improving the products of the Southern Pine lumber industry, the development of new uses and reduction of cost to consumers. Ideas are being received from lumber manufacturers in order to determine the priority of projects.

PLYWOOD PANELING BROCHURE

The Architectural Woodwork Institute's seventh in the continuing series of brochures has been released to 10,000 architects of members' choice throughout the United States and Canada. The 8-page brochure, which was prepared by a Technical Advisory Committee, made up of Institute members, deals with the subject of "Plywood Paneling."

The brochures are available from any member of the Architectural Woodwork Institute or from the Institute's headquarters, 332 South Michigan Ave., Chicago 4, Ill.

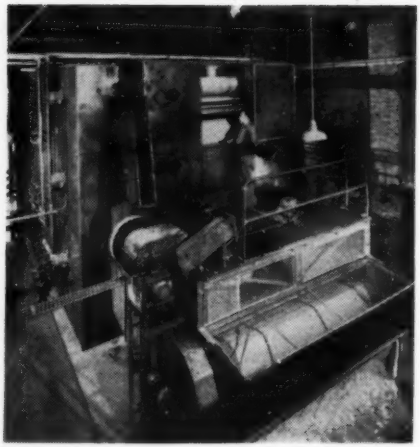
REES BURNERS
UP FASTEST . . .
LOWEST COST
You build REES burners yourself because sections are easy-to-handle and merely bolt together. Burned-out plates are easily replaced. Those two design features make REES burners the most economical to buy, fastest to build, and easiest to maintain. Find out about REES economy and REES whirlwind combustion . . . they mean the best in burners. Write any REES factory or representative.
SEND FOR CATALOG NO. 37E
SINGLE WALL
Primarily for mills, supplied knock-down from 16' to 100' dia.
DOUBLE WALL
For woodworking plants, supplied knock-down from 16' to 61' dia.
REES BLOW PIPE MFG. CO., Inc.
2929 Fifth Street, Berkeley 10, Calif.
REES BURNERS, Ltd.
1331 W. 6th Ave., Vancouver, BC, Canada
REES BURNER & BLOWPIPE CO.
P. O. Box 225 • Memphis, Tennessee

Armour and Company Reopens Chrome Hide Glue Plant

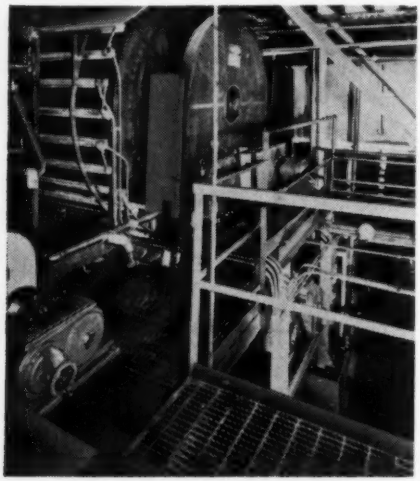
Reopening of Armour and Company's chrome hide glue plant in Chicago has been announced. A new feature in the operation is a mechanical drying method which eliminates impurities from the glue, speeds the process and assures a better product.

The method consists of spreading concentrated liquid glue on a revolving, heated drum. The glue forms into a sheet and is moved through a huge apron dryer where the moisture is removed. At the end of the dryer the sheet of glue is broken into pieces which are later ground and bagged.

The drying operation takes 50 minutes compared with a one to three day period under the old air drying system, Mr. Lewis said.



Sheet of glue resembles festoon of paper as it rolls through apron dryer where product is dried. Brittle sheet is then broken into pieces before glue is ground and bagged.



Liquid glue is spread on huge revolving drum at start of new chrome hide glue drying process at Armour and Company.

"Heat and bacteria are the worst enemies of glue in its liquid state," he commented. "The new dryer, with its controlled temperature and rapid movement, prevents deterioration of the product. Contamination from air borne bacteria or foreign particles such as dust is also eliminated with this method."

Chrome hide glue, lighter in color than other animal adhesives, is used by the furniture industry, book binders and box manufacturers.

VENEERED FIBERBOARD

Production of a veneered fiber-board at its plant at Bemidji, Minn., is expected in October, Nu-Ply Corporation has announced. Production at the firm's plant at South Bend, Wash., is already underway, with the veneer being supplied by the plant in Minnesota.

The process of manufacture of this board was developed by Elmendorf Research, Inc., Chicago, with a view to conservation of natural resources as

THE POWERMATIC
MODEL 50-6'' JOINTER FEATURES

The longest bed on the competitive market

This new production type jointer is actually LOADED with features. The extra long 48" bed assures perfect edges no matter how long the board. Knife setting in a Jointer has always been an extremely difficult task, but the Model 50, standard equipped with "jack screws" in the cutterhead, allows quick adjustment in a minimum of time. An exclusive new center mounted fence features a positive lock at 45° and 90°. The rigid center mounting prevents uneven edges common in end mounted fences.

Also Manufacturers of 12", 16", 20" Planers, Mortisers & Tenoners

Manufactured by

POWERMATIC MACHINE CO.
McMINNVILLE, TENN.

well as for economy in manufacturing a new form of plywood.

The product at Bemidji, for interior use, is made of chipped northern pulp wood that is fiberized, mixed with binder, veneered and hydraulically pressed, cured and stabilized in one operation, the manufacturer points out.

Veneers for faces and backs are sliced to thicknesses as thin as 1/64 inch. Nu-Ply points out that the veneer, bonded with special resins, comes out of presses with the finished appearance of a sanded surface. Machinery and equipment were designed by the Industrial Development Co., Tacoma, Wash.

LAMIN-ART PLANT EXPANSION

Fabricon Products, one of the nation's foremost manufacturers of impregnated plastic materials, has just purchased complete Wilson & Hoppe Plastics Company assets. The dramatic move will eventually place the laminating operations of Lamin-Art and Fabricon's Impregnating Division under the same roof in Fabricon's huge 7½ acre plant site in Los Angeles. The augmented West Coast facilities will result in providing direct advantages to those who use and distribute Lamin-Art high-pressure decorative laminates.

Fabricon Products, in its 35th year in business, has main offices in River Rouge, Michigan, where it also has a plastic impregnating paper plant. The firm, a division of the internationally known Eagle-Picher Company, is a major factor in the Laminating industry as the pioneer supplier of plastic-impregnated papers for numerous major plastics laminators in the United States and Canada.

Louis A. Fisher, President of Fabricon Products, in a statement, said, "Of immediate interest to users of Lamin-Art is the fact that far superior uni-

NEW!

MARCOLOY CARBIDE DOVETAIL BITS

Eliminate "down time" on your dovetailers with carbide bits. A perfect cut gives you a perfect match. Write for catalog and prices.

MARCOLOY CARBIDE ROUTER BITS

Improved design is 5-ways better. New low prices. Write for folder.

Dealer Inquiries Invited

MARCOLOY CARBIDES

MARCOLOY, INC.
Springdale, Conn.

SIMPLEX
CIRCULAR SAW SETTING MACHINE

An excellent tool for setting small circular saws. The successful operation of all circular saws depends largely upon the manner in which they are fitted.

To obtain the best results the teeth should be properly and evenly set.

This machine does the work perfectly, insuring easy and true running and smooth cutting.

The hammer strikes every blow with equal force and at the same angle hence the set of each tooth is absolutely uniform. Will give a light, medium or heavy set.

Adjustable for saws, either rip or cut-off, from 9" to 24" in diameter.

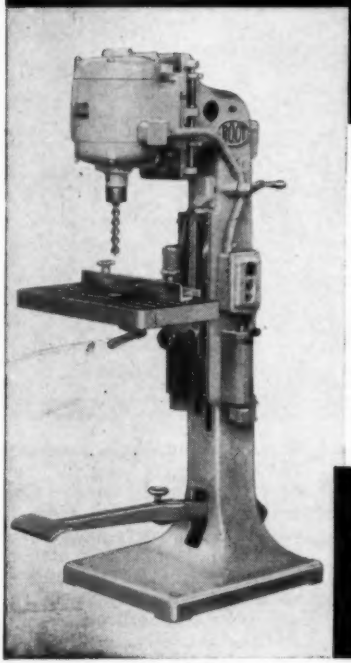
The machine will last for years if handled with ordinary care and intelligence.

Further details upon request

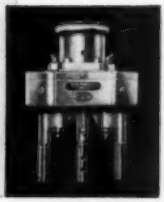
ZEILLER & NAGEL, INC.
232 JAVA ST. BROOKLYN, 22, N.Y.

ROOT STYLE GM

BORER OF MANY USES



- Single Bores
- Mortise Cuts
- Multiple Bores with Cluster Heads
- Power Feed
- Foot Feed
- Many other surprising and interesting features. Write for details.



Root Style GM as single borer. | Typical Cluster Head | Mortise Chisel Unit

B. M. ROOT CO. | **YORK, PA.**

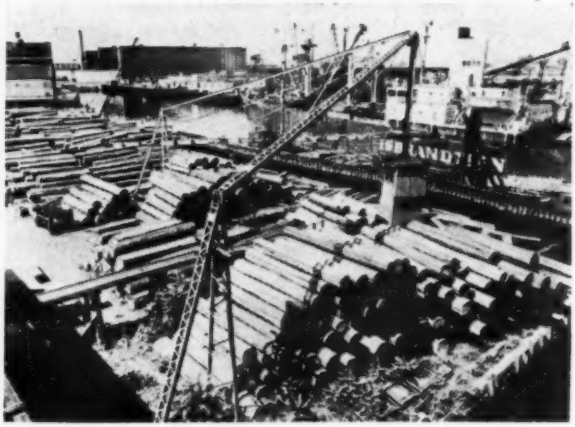
form product quality will be assured through Fabricon Products' extensive product quality control program covering the complete production cycle, from impregnation of raw materials to the finished sheet of Lamin-Art.

In a special announcement, C. L. Keller, Fabricon Plastics Division General Manager, advised, "Lamin-Art production will be increased. Eventually, complete production from decorative paper processing to finished plastic laminates sheet will be established in the new $1,500,000 plant in Los Angeles."

Gene Feltner, sales manager for Wilson & Hoppe, continues to serve the expanded Lamin-Art trade as Fabricon Products' Laminated Plastics Division Sales Manager.

Some folks are born poor, but parents of college students get that way by degrees.

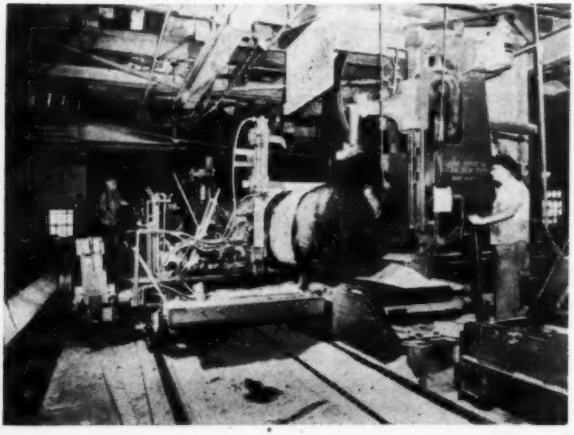
Nation's Oldest Mahogany Mill Receives Largest Mahogany Shipment In U.S. History



African Mahogany logs from Ivory Coast of French West Africa are placed in huge log storage piles at Palmer and Parker Co., Charlestown District, Boston, Mass.

The largest single consignment of mahogany ever imported into the United States arrived in August at the Mystic River docks of Palmer & Parker Company, of Charleston, Mass., importers and manufacturers of mahogany and veneers. Three ships were engaged by the company to bring the 9,500 tons of mahogany logs from French Equatorial Africa's Ivory Coast.

Made up of over 2,800 individual logs, this shipment could produce more than 75,000,000 sq. ft. of 1/28" veneer. However, Palmer & Parker Company will only produce veneer from that portion which meets their exacting standard. It is expected only 25% of the wood will be of quality suitable for veneer and so only about 18,000,000 ft. of veneer will be manufactured from this lot. The additional material, not suitable for veneer, will be manufactured into lumber.



African Mahogany log is opened with a high speed band saw at Palmer and Parker Co. mill. It is here that the quality of the log becomes known and a decision made as to the ultimate use of the wood. At this point it is marked for veneers, boat lumber, or other types of lumber.

buyers' service

AVAILABLE WITHOUT CHARGE TO OUR READERS

If you will list below the wood-working machines, supplies or machine shop equipment in which you are interested and mail this page to us, we shall be glad to refer your needs to the manufacturers or others in position to serve you. Replies will come from them — not from us.

If you have any special shop problems let us have the details. Often we can make helpful suggestions.

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HITCHCOCK PUBLISHING CO.
222 E. WILLOW AVE. WHEATON, ILL.
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Mechanics Through the Ages

AS EARLY AS 1630, CRUDE RAILWAYS OF WOOD WERE USED BY SCOTTISH COAL MINERS TO HELP HORSES PULL HEAVIER LOADS OUT OF MINES. **130** YEARS LATER, THESE COAL MINERS WERE FASTENING THEIR WOODEN RAILS TO TIES, SPIKING STRIPS OF ROUNDED IRON MOULDINGS ATOP THESE RAILS AND HOLLOWING OUT THEIR CART WHEELS TO FIT THE ROUND SURFACES!

AL REETZ-

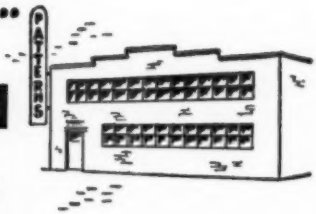
ONE CRAFTSMAN OF ANTIQUITY ---- MYRMECIDES OF MILETUS —IS SAID TO HAVE FASHIONED METAL HORSES AND WAGONS SO TINY THAT THEY COULD EASILY BE COVERED BY THE WINGS OF A **FLY!**

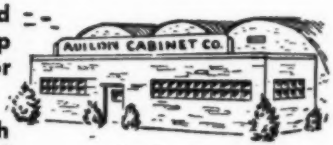
SOME OF THE PULLEYS USED BY THE ANCIENT EGYPTIANS TO HAUL BUCKETS OUT OF WELLS AND STONES TO HIGH PLACES WERE MADE OF TAMARISK WOOD WITH ROLLERS OF FIR.

ROPES COMMONLY USED WERE FASHIONED FROM THE FIBERS OF **DATE TREES!**

Good News Gets Around...

Moak Hand Planers and Jointers





FOR FAST-FEED, VIBRATIONLESS PRODUCTION ON DOZENS OF SHOP JOBS

You get more for your money in Moak Hand Planers and Jointers, the indispensable shop tool for jointing, planing out of wind; for chamfering, rabbeting and beveling.

Tungsten steel knives are fitted in the high carbon alloy steel cylinder head, the head mounted in self-aligning ball bearings enclosed in dust-proof housings. Available in sizes for planing 12″ and 16″ lumber; equipped with ½″ rabbeting groove, adjustable bevel gauge and hand brake for safety.

Get the facts **on Moak Hand Planers and Jointers right away. Write for our illustrated descriptive and specification folder.**

The Market Place

Rates for Classified Advertisements

Lists of Used and Rebuilt Machinery, either For Sale, Wanted, or For Exchange, set in uniform style, will be published in the Classified Section at the rate of $7.50 for name and address and a five line advertisement. For additional lines, only 75c per line.

DISPLAY ADVERTISEMENTS: 1 inch (Minimum), $8.50; 2 inches, $17.00; 3 inches (Maximum), $25.00.

Write directly to those offering the machine for sale, for prices and full descriptions. If what you seek is not advertised, write Hitchcock Publishing Company, 222 E. Willow Ave., Wheaton, Ill., making known your wants on either new or used machinery and the publisher will gladly assist you.

FOR SALE

S. W. Harrington, Inc.

P.O. Box 230 **Asheville, N.C.**

Air Compressors, various sizes
Band Saws, Amer. 42", Belted MD
Band Saw, Greenlee No. 410, 36" bb, dmd
Band Saw, New Delta 20" bb-dmd
Band Saw, F&E No. 50—36" bb v-belt & motor
Blowers, Garden City 55"
Borer, Andrews 3 spindle vertical bed
Borer, J. Superior 2 spdle. horiz. M.D.
Borer, Greenlee No. 370, bb. dmd. Horiz.
Borers, Greenlee No. 369—5' DMD
Borers, McKnight No. 88, dmd.
Borer, W&M 283-B, bb dmd, single spindle
Boring & Sawing, McKnight 26F dmd
Carvers, Y-A, and Porter BB, DMD
Clamps, Handy No. 71 revolving
Clamps, Taylor cat. 30 sec.
Clippers, Coe 88" bed and motor
Dovetailers, Dodds, 20 spindle
Dowel Driver, Bell No. 8
Dowel Mach. Bell bd. & motor
Frequency changers, 30 KW
Glue Jointer, Jenkins No. 343A bb-dmd
Glue Spreaders, 12" Black Bros. dmd
Jointers, Glue, Yates-American No. 213 bb-dmd
Jointers, New Moak 12" bb-dmd
Jointers, Porter 16" and 24" bb-dmd
Jointers, Yates No. 199, 12" bb. v-belt drive
Kiln Trucks, 4' & 6' roller bearing
Lathe, Yates No. 74 bb-dmd
Mortiser, Sidney, single-spindle pb. bd.
Mortiser, New Britain No. 7 bd. & motor
Mortiser, W&M No. 233—5 spindle Horiz. dmd
Moulders, Mattison No. 222, 6" bb-dmd
Moulders, Yates-American C88, 8" bb-dmd
Moulders, Yates-American C-89—6" bb-dmd
Planers, F&E—30" double, pb. bd & motors
Planers, Berlin 36" round head dmd
Planers, New Crescent 24" bb-dmd
Planers, Buss, 44, 36" sgl. bb, dmd.
Planer, F&E No. 156 36x7 dmd. round head
Planer-Matcher, Yates A1-15"x6" round heads, pb. bd.
Redrier, Merritt 12 plate 36x72
Routers, Onsrud, Air 20M speed
Routers, EC No. 327 bb. dmd.
Routers, Defiance single spindle high speed dmd
Sanders, Indiana Mldg. bb. dmd.
Sander, Yates No. 430, semi-stroke, bb-dmd
Sander, Yates No. 431—43" 3 drum endless dmd
Sanders, Niagara brush, bb-dmd
Sander, 48" double disc, dmd
Sanders, F&E 60" 3-drum roll feed, dmd
Sanders, McKnight single drum 24"x16" dmd
Sander, W&M No. 171 belt bb., m.d.
Sanders, W&M No. 294 8 ft. stroke, bb-dmd
Saws, Hermance 300G Gang Rip. dd. dmd.
Saws, Mattison No. 207, bb. dmd.
Saws, F. & E. No. 530, bb., dmd.
Saws, Beach dbl. cutoff, bb. & motor
Saws, Greenlee No. 493, variety, bb-dmd
Saws, Hermance Gang Rip, pb & motor
Eaglesfield Swing Cut-off Saw, BB, DMD.
Saws, New Delta-Crescent 12" tilting arbor dmd
Saws, New Multiplex 40A & 50A
Saws, Porter C-43, cutoff, bb-dmd, & tables
Shaper, Defiance double spindle, bb-dmd
Shaper, Whitney No. 389, double bb-dmd
Shapers, New Moak single spindle bb-dmd
Shapers, Greenlee No. 180 double bb-dmd
Shaper, Whitney double spindle, bb-dmd
Sticker, American No. 1, 1 side 4" pb. bed
Taping Machines, Dennis No. 2
Tenoners, Yates-American No. 55 single end, bb-dmd
Tenon Heads, single and double end
Tenoner, Hayes 6 ft. dbl. with copes, pb., bd. & motor

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Mortiser & Borer, American horiz., 5 hp, HC MD, $300
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Ripsaw, Barnes roll, self feed, $185
Sander, belt, American 14 in. drawer, $150
Sander, edge belt, DMD, $175
Saw, Roll table cutoff, $75
Swing Saw, Towsley DMD BB, $150
Tenoner, American No. 2-1-2 sgl. cope and mtr., $250
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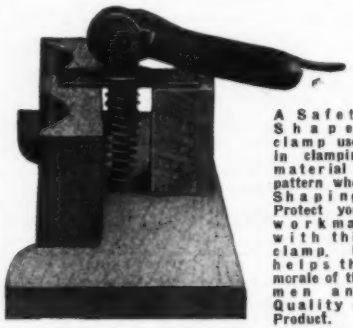

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No. 74 Yates Automatic Lathe, babbitted bearing, belt drive, having nine heads with knives with 2-1 1/16" spindle.

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1 complete Moore 40 ft. cross circulation Modern gas fired, completely automatic dry kiln with tracks.

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Address replies to Box 201,
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desires connection with well rated national distributing organization to handle high quality adhesive on volume basis. Please contact

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Well established mid-south manufacturer producing ponderosa pine millwork needs:
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- Moulder set-up man

Give full particulars as to education, experience, etc.

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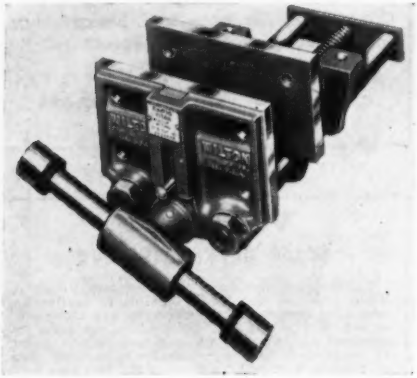
The new vises are available in eight models, either continuous screw or rapid



acting types. Rapid Titan models reportedly operate as two vises in one, since they change from free-sliding action to screw-lock action automatically. With the screw and nut engaged, tightening action can continue a complete turn or more.

ELECTRONICS IMPROVE INSERTED SAW TEETH

A new, low priced inserted saw tooth with improved quality and durability for head saws and edges has been announced by Pacific Saw & Knife Co., 910 S.E. Stark, Portland, Ore. Called Pacific "Tiger Teeth" the new saw bits are made by an electronic process that impregnates the steel with chromium and puts a hardened edge on the parent metal without plating of any kind. Extensive tests by the manufacturer and advance reports from users show that the teeth do not chip, fracture or break and edges maintain sharpness and respond to sharpening in a way far superior to teeth made under former treating methods.

Pacific Saw & Knife also specializes in the manufacture of carbide-tipped saws and groovers for plywood and lumber industries.

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Complete Line Delta Machines — Kindt-Collins Sanding Equipment

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Tannewitz G 30" Ball Brg. DMD
Oliver No. 173 Jig Saw, 36", Motor drive
Crescent 36", V-Belt, Motor Drive
American 42", V-Belt, Motor Drive
Silver 20", V-belt motor drive

BAND, RIP AND RESAW
McDonough 62", vertical band resaw
Mershon 42" Twin Band Rip, B.B.

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Valley City Two Spdl. Horizontal
Jenkins No. 123 Gang Stile Borer and Motor
Rogers single spindle, horizontal
McKnight No. 26-F. double end, M.D.

BLOWERS AND FANS
American No. 80-E with 40 H.P. coupled motor

CLAMPS—GLUEROOM EQUIPMENT
Francis 3'x8' Hand Screw Veneer Press
Greenlee No. 599 frame and furniture clamp

FILING ROOM MACHINERY
Hanchett 76" style DN Knife Grinder, M.D.
Covel Hanchett OK 42" Knife Grinder, M.D.
Wardwell Y-18 Circular Saw Filer, M.D.

JOINTERS
Porter Type "C" 12" DMD Ball Brg.
Porter Type C 24" DMD Ball Brg.
Diehl No. 66, continuous feed, direct M.D.
Yates No. 199, 20" round head V-belt M.D.
Meyers continuous feed, V-belt, M.D.

LATHES
Oliver 66A; 30-48" swing Gap Lathe; B.B. M.D.
Porter 16"x10' Bed Cabinet Makers Lathe
Oliver No. 25 20"x12' Bed Pattern Makers Lathe
Smith B-42 Ball Brg. Auto. Variety Lathe

MORTISERS
Wysong & Miles No. 284 Auto. Hollow Chisel
Greenlee No. 227 hollow chisel, mtr. driven.
Sidney No. 707 Chain automatic feed M.D.
Sidney 705 Hollow Chisel Automatic feed, M.D.
Whitney No. 67 Oscillating Bit, M.D.
New Britain No. 2 Chain with motor

MOULDERS
Vonnegut 6" All Electric
Yates-American C-88, 12" All Electric
Newman 4x4, All Electric
Yates No. 108, 10" belt drive coupled motor
Woods No. 132 M 6" Electric

NAILING MACHINE
Diehl No. 40 16 track 40" open back
Auto Nailer "Blue Model," M.D.

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Whitney No. 32 30" Single, Ball Bearing, M.D.
Yates No. 156 30" Single, Ball Bearing, M.D.
Yates B-2 36" double, M.D.
Yates No. 156 20" round head, M.D.
Yates No. 177 30"x12" double M.D.
American No. 80 15" double, heavy duty

ROUTERS
Ekstrom-Carlson No. 126, B.B., M.D.
Carter R2A floor model, 1 phase motor.

SHAPERS
Onsrud W125B Two Head Automatic, Mtr. Driven
Whitney No. 239 Double Spindle, D.M.D.
Porter No. 103 single, ball bearing, M.D.
Whitney No. 165 S.S. motor on arbor
Whitney No. 47A, dbl. spdl., short belted m.d.
Greenlee No. 180 double spindle, D.M.D.
Whitney No. 250 Double Spindle, D.M.D.

SANDERS
Nash No. 35 Handle Sander Motor Driven
Salem No. 370 42" Two Drum
Yates No. 421 6-drum with motors
Fay & Egan 30" 2-drum end. bed., M.D.
American No. 2 Disc and Spindle Combination

MITRE SAWS
Tannewitz Type J DMD Ball Brg.
American No. 1 Tilt Table, V-belt drive.
Whitney No. 61 tilting arbor, D.M.D., B.B.

CUT-OFF SAWS
Sidney No. 720 Straight Line motor on arbor
Oliver No. 94-D Straight Line, Motor on arbor
American No. 51 swing saw, M.D.
Multiplex No. B-60 radial arm, 7½ H.P. motor

RIP SAWS
Mattison No. 202 chain-feed, dir. mtr. driven
American self-feed with motor
Greenlee No. 426 Roll Feed with motor

TENONERS
Greenlee No. 534 Single End, No Copes, DMD.
Whitney No. 62 Single End Saw Tenoner.
Jenkins No. 95 double-end, D.M.D.
American No. 1 Single End, belt drive
Crescent No. T-3 Single End DMD Ball Brg.

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Blowers & Cyclones, various sizes.
Borer, vert., Greenlee No. 371, 12", power-feed
Borer, vert. Andrew 60", 5-spdl., power-feed
Borer, horiz., Greenlee No. 370, 6', power-feed.
Clamp, Handy No. 64, air-powered, sofa and chair.
Corrugated Fastener Driver, Doig "Mono-Fast" sgl. hd., 2 h.p.
Dowel Machines, Crescent & Jenkins.
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Planer, dbl., Whitney No. 24, 30"x7", ball-bearing, 3 motors.
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Ripsaws, sh. fd., Mattison Nos. 205 & 207, Diehl No. 55, built-in motors.
Ripsaw, self-feed, Sinker-Davis, ballb., 8" arbor.
Radial saws, DeWalt 3 h.p., Multiplex 5 h.p.
Sander, 3-dr., Yates No. 431, 43", endless bed.
Sander, sgl.-dr., Parks 24"; Yates-Amer. No. 411, 42".
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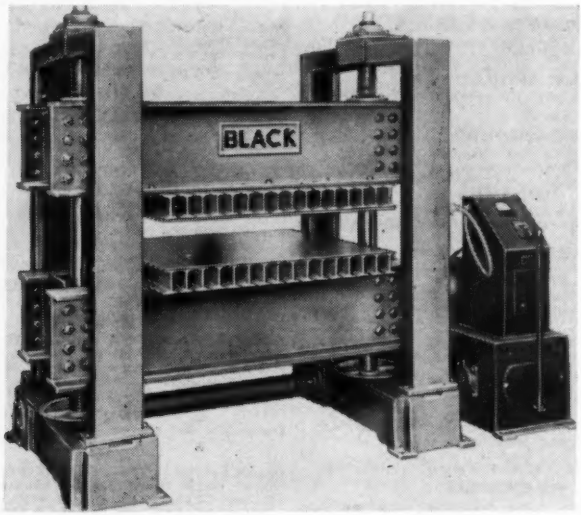

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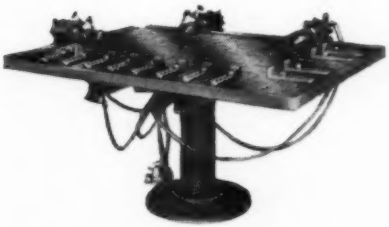
Many of the leading furniture manufacturers in the United States and Canada prefer LANCASTER CLAMPING EQUIPMENT!

LANCASTER NO. 400-B AIR-OPERATED FRAME CLAMPING MACHINE

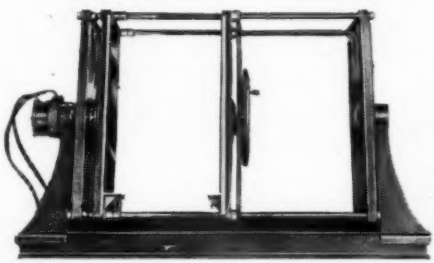


The LANCASTER No. 400-B has been designed to handle the many varied frame clamping operations encountered by the furniture manufacturer. This machine can be used for clamping mitered, tenoned and doweled frames. Due to the flat table construction and set-up advantages, mitered doors and frames with spline corner joint construction can be conveniently constructed while under pressure. Controls are provided on either side of machine. All clamping units can be instantly moved along machined steel track by loosening hand lock wheels on either side of units. With this feature the operator can conveniently change pressure point after set-up has been made.

We also make this machine with an additional clamping unit on the set-up end of machine and double air controls with quick change connections. With this arrangement all four cylinders can be operated from one control valve. This would be used for large frames. Machine would be arranged with two clamping units on the side and two on one end. This Dual Control Machine is especially suited for clamping china or buffet doors using double set-up on individual doors or batch clamping two or more using pressure from three sides with all four cylinders connected to one control valve. When clamping two or more frames in one operation, the pressure from both ends enables a smooth clamping operation which would be impractical with pressure from only one end. In a matter of minutes, hose on two of the clamping units can be quick-changed so that machine can be used on any two separate operations from separate control valves at the same time—thus, permitting this one machine to do the work of two single control machines.

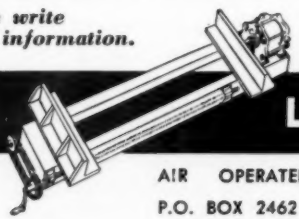
We will be glad to supply picture and full information on the No. 400-B with special dual controls.

LANCASTER NO. 1100-C AIR-OPERATED REVOLVING CASE CLAMPING MACHINE



You can build quality cases that are consistently square if you use the LANCASTER No. 1100-C Revolving Case Clamp. The patented features permit clamping performance that far excels that of conventional case clamping machines. One of the outstanding features of our case clamp is the four steel collars so mounted as to stop pressure jaw in a perfectly square position. This allows you to produce square cases and yet clamp with as much as two thirds of the case below the center of the jaws. Another important feature of our case clamp is the separate set-up jaw and pressure jaw. With each of these jaws separate, the opening adjustment is confined to the length of the machine with no additional floor space taken up by a protruding set-up screw.

Please write for further information.



We can furnish overhead pressure units for this machine to fit your requirements.

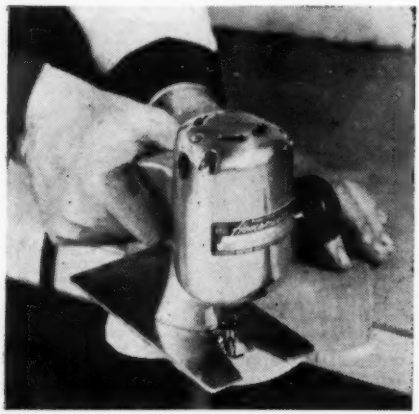
J. M. LANCASTER, INC.

AIR OPERATED FURNITURE CLAMPING MACHINERY

P.O. BOX 2462 • GREENSBORO, N. C.

Syracuse, N. Y. This compact and versatile machine combines the functions of a jig-saw, router, jointer and shaper table.

A rectangular base converts the Model 140 Routo-Jig quickly for jig-saw work while a circular base makes it a router. Attached in an inverted position to a shaper table, the tool becomes a shaper and jointer in seconds.



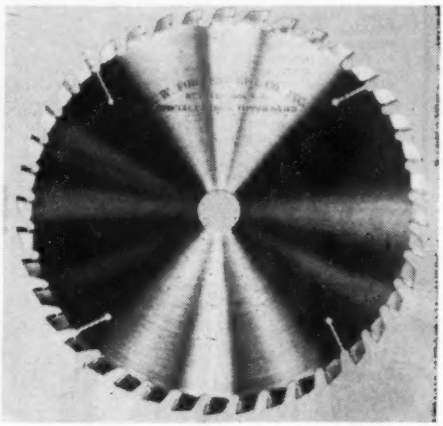
Furniture manufacturers, industrial woodworkers, pattern workers and maintenance crews will discover many uses for this handy, low cost tool. Building trades will find the Routo-Jig perfect for dadoing, rabbeting, rounding, profiling and molding in the construction of kitchen cupboards, sink bases, Formica counters, bookcases and fireplace mantels. Templates speed up cutting of hinge seats, door locks and dovetails. Tongue and groove and other edge-matching glue joints may be cut with straight face cutters.

For ornamental work, a choice of bits permits a wide variety of fancy furniture cuts such as compound molding, veining, fluting, reeding, beveling, V-grooving and freehand routing from surface areas.

SAW BLADE FOR MITRE CUTTING

The A. W. Forrest Manufacturing Company, Inc., of Rutherford, New Jersey, has recently announced a new carbide-tipped saw blade designed specifically for precision mitre cutting applications. It is particularly adapted to the cutting of picture frame moldings, plastic tubing (hollow and solid), and other compositional materials. The new blade is one of hundreds of custom designed blades developed by the A. W. Forrest Manufacturing Company.

An outstanding feature of this new design is that it not only assures a smooth end cut every time, but eliminates end-piece "kick-outs". These kick-outs, up until now, have been a difficulty peculiar to mitre cutting. They are not only a safety hazard, but cause undesirable chipping of the cut piece. Since the Forrest blade cuts the

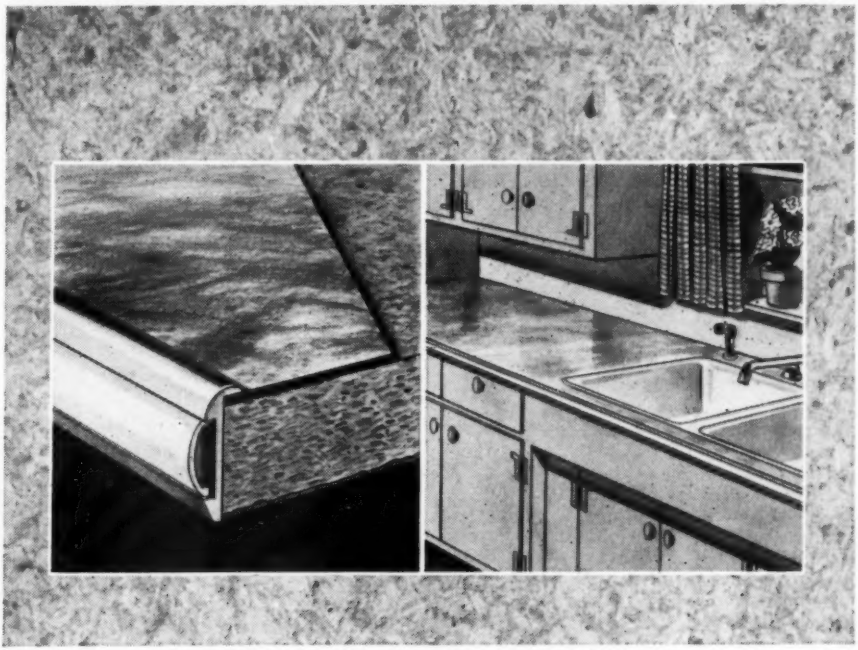


molding with a clean, no chip edge, allowing the end piece to drop harmlessly beside the blade, this hazard does not exist.

MODERN DESIGN FOR 54" VERTICAL BAND RESAW

Completely new from base to top wheel, the modern design of this new 54" vertical band resaw reflects the many engineering advances, incorporated in the machine according to the manufacturer, McDonough Manufacturing Company, Eau Claire, Wis.

AN IDEAL BASE FOR BETTER PRODUCTS



Weyerhaeuser
4-Square Particle Board

IN MANY PRODUCTS, quality begins at the core. Weyerhaeuser 4-Square Particle Board has been engineered to provide the specific combination of characteristics that make it an ideal base for decorative surface materials of all kinds. It is strong and durable, dimensionally stable, easily machined, uniform in density and thickness, free of grain and knots. It provides two smooth, sanded surfaces that give amazingly tight laminations with minimum glue. No crossbanding necessary, because there are no grain or knots to mirror through the wood veneer or plastic laminate surfaces. Has good screw holding characteristics in either edge or surface, also retains drive-in "T" molding tightly; edges may be banded with wood veneer or plastic strips. Comes in 4'x8' panels or cut to size: ½", ⅝", ¾" thicknesses. Write for sample . . . and descriptive literature.

Weyerhaeuser Sales Company
Saint Paul 1, Minnesota

Send coupon for folder

Shows machining operations, suggests various uses. Get your free copy now. Find out how Weyerhaeuser 4-Square Particle Board can help make better products... for you!

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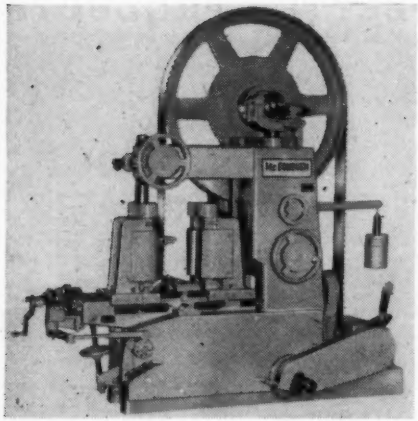


Improvements in materials and fabricating techniques in recent years have made practical such things as the one piece top wheel casting of high tensile iron. Other design improvements include a massive box type top saw guide arm which provides maximum saw support for extra accuracy; a compact, streamlined column casting designed for maximum strength without excessive weight and an extra heavy cast iron base with the roll cradle stand cast as an integral part.

Typical engineering improvements include a non-rotating top wheel shaft around which the top wheel rotates on heavy duty Timken bearings; an ultra-sensitive, double column type saw strain; a shorter, heavier lower wheel shaft and more flexible feed works which will tilt up to 14°. A lever set and a power opening and closing device are available at extra cost.

MOISTURE REGISTER

This moisture register weighs only 5 lbs. and is completely self-contained. Tests can be easily made without special preparation. Dial readings are clear to unskilled operators. Contact the surface; press the button; then read the dial for the answer.

Moisture Register is completely portable. Material can be tested during processing or drying, or at point of shipment. Convenient carrying case is supplied with each instrument.

For additional information, write to Moisture Register Co., 1510 W. Chestnut, Alhambra, Calif.

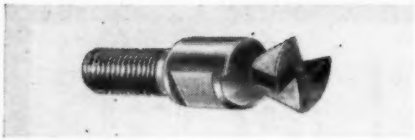
NEW CARBIDE DOVETAIL BIT ELIMINATES "DOWN TIME"

A new carbide dovetail bit so long wearing that it practically eliminates "down time" on dovetail machines (while bits are being changed, sharpened, and setup) has just been announced by Marcoloy, Inc., Springdale, Conn.

This carbide dovetail bit is newly-designed for long wear and is diamond ground for precision and accuracy. The size is maintained when the bit is sharpened.

Because carbide bits wear so much longer, frequent sharpenings are unnecessary. Thus, the time required for changing bits and setting up the machine is eliminated.

A new design feature produces a clean sharp corner on the tenon, insuring a perfect match when the drawer sides are fitted together. Mismatching is eliminated, even after the bits are sharpened.



The Marcoloy design does not require saw teeth, an advantage because the saw cut weakens the tenon and causes splitting.

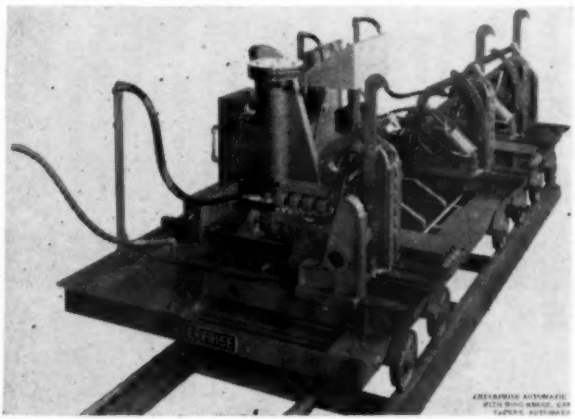
Marcoloy carbide dovetail bits are available in all standard sizes for prompt shipment.

BLOND TWINS OREGONBORD

Blond hardboard is making tremendous strides according to Chapman Manufacturing Company, Corvallis, Ore. They have just recently introduced two new textured products that have received ready acceptance.

Using the exclusive new OregonBORD Embossed Process, this manufacturer now is able to offer blond hardboard in a raised design. The texture is actually raised in a beadlike texture instead of the cut-out surface offered in many other products.

SAWMILL CARRIAGE



A new heavy-duty automatic sawmill carriage—completely air-operated, and designed for sawing both hard and soft woods—is now being made by the Enterprise Company, Columbiana, Ohio.

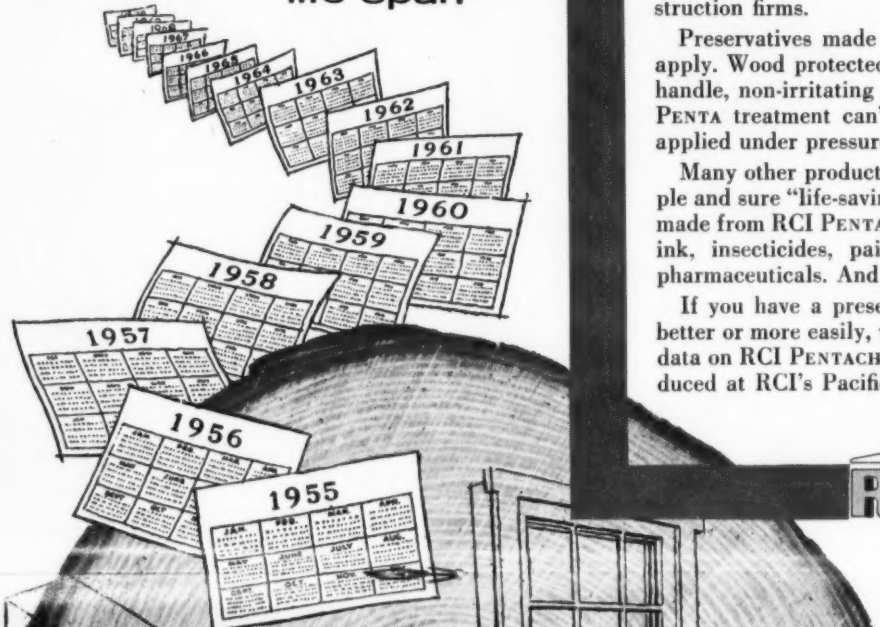
The new carriage has a 44" opening, and is designed for maximum accuracy and cutting speed, handling flexibility, and rugged service under the punishment of turning logs, sprung logs, and reversing loads. The carriage is completely push-button operated from either setter or remote locations. The setworks, dogging, tapers, and flipper controls are contained in a convenient, compact enclosure. The automatic air-electric setworks is Enterprises's own design.

Air-dogging and air-electric settings are independent, and each independent knee is fitted with four built-in air cylinders, providing maximum flexibility of motion. Specially-designed non-defacing board dogs are built into each knee, which are capable of dogging a 1" thick last board. Air-operated cant flippers and carriage offsets are standard equipment. Wing knees with auxiliary blocks are provided as extra equipment, which are especially useful in holding sprung hardwood logs.

To take a great weight off your mind, discard your halo.

RCI PENTACHLOROPHENOL

stretches lumber's life span*



● Let's consider just one of the outstanding preservative jobs that RCI PENTA does so well.

RCI PENTA is the wood preservative ingredient that adds *years* to the life of wood at low cost. It makes possible solutions that keep wood virtually maintenance-free, and reduce wood replacements drastically. Penta formulations make wood *impervious* to rot, termites, water, and free from warping and checking. Penta treatment is proven . . . successfully used for years by industries vitally concerned with keeping wood expenses down — the utilities, railroads, big construction firms.

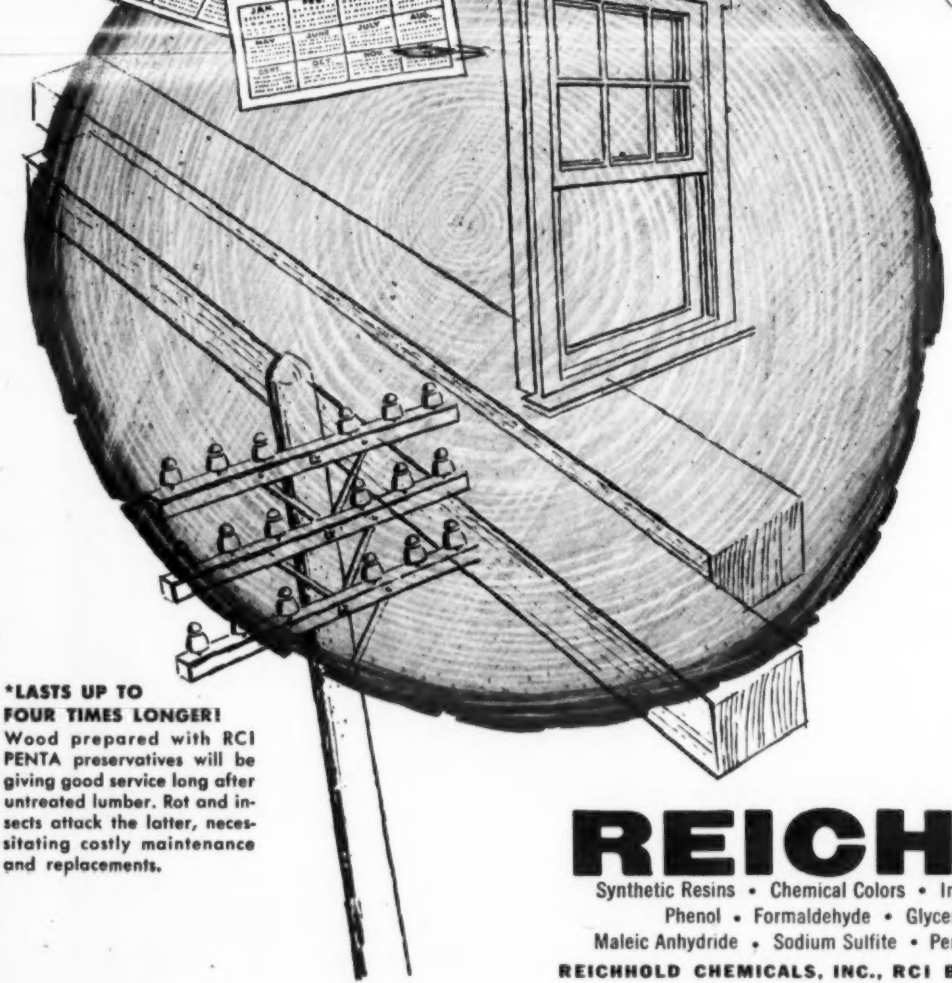
Preservatives made from RCI PENTA are clean to apply. Wood protected by them is also clean, easy to handle, non-irritating to the skin and paintable. RCI PENTA treatment can't wash out or leach out when applied under pressure.

Many other products besides wood now receive simple and sure "life-saving" treatment with preservatives made from RCI PENTA . . . gelatin, glue, latex, leather, ink, insecticides, paints, paper, food, fabrics and pharmaceuticals. And lots more!

If you have a preservative job that could be done better or more easily, why not write Reichhold for full data on RCI PENTACHLOROPHENOL . . . now being produced at RCI's Pacific Northwest Division in Seattle.

RCI

Creative Chemistry
Your Partner



Creative Chemistry
Your Partner
in Progress

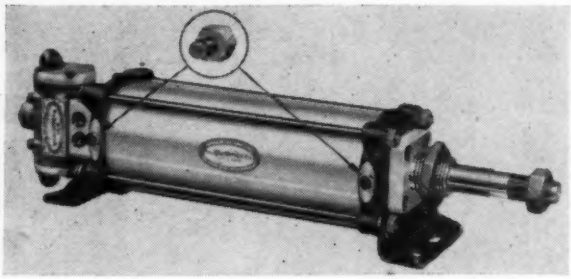
***LASTS UP TO FOUR TIMES LONGER!**
Wood prepared with RCI PENTA preservatives will be giving good service long after untreated lumber. Rot and insects attack the latter, necessitating costly maintenance and replacements.

REICHHOLD

Synthetic Resins • Chemical Colors • Industrial Adhesives • Plasticizers
Phenol • Formaldehyde • Glycerine • Phthalic Anhydride
Maleic Anhydride • Sodium Sulfite • Pentaerythritol • Pentachlorophenol

REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N. Y.

BELLOWS CUSHIONED AIR MOTOR

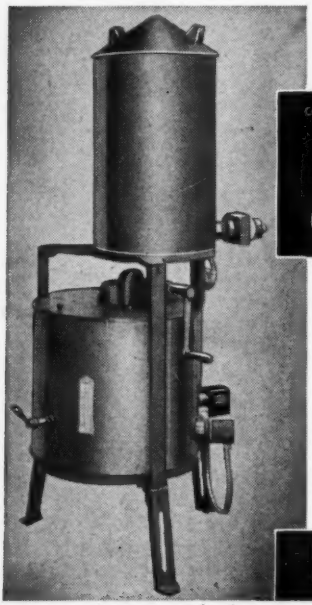


The Bellows Company, manufacturers of "Controlled-Air-Power" work devices, has added to its air cylinder line a 2½" bore air motor with adjustable cushioning at either or both ends.

The unit features the built-in 4-way valve and speed controls characteristic of other Bellows air motors. Built-in 4-way valves are available for 8-volt or 110-volt momentary contact electrical control (including explosion-proof models); 110, 220, 440, or 12-volt maintained contact control; direct mechanical or manual control; air-pilot valve control; and air-poppet valve control.

The cushioned air motor is available in all standard mounting styles. Operating at air pressures as high as 175 psi, it develops a thrust equal to five times the air pressure applied.

Cushioning is fully adjustable by a metering screw located in each cushioned head. Metering screws are equipped with locknuts to prevent changes of settings during operation. Cushioning is effective on the final ¾"



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You always have the exact amount needed without any waiting, dilution or evaporation . . . always uniform consistency. Today send for the full story on the first machine to really preserve ALL the quality of fresh animal glue . . . the ZIMMERMAN CONVERTER featuring Automatic Temperature Control . . . available in steam or electric models.

WRITE TODAY TO

INSTANTANEOUS GLUE CONVERTER COMPANY
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of the stroke.

For more information write to W. C. Richards, Jr., the Bellows Company, Akron, Ohio.

COAXIAL TRIODES

Machlett Laboratories, Springdale, Conn., announces the ML-6426 and ML-6427 coaxial-terminal triodes, employing thoriated-tungsten filaments, for industrial and broadcast equipments of 25-50kw power output. The new triodes provide considerably improved performance ratings, safety margins and strength over tubes heretofore available. New thoriated-tungsten filaments greatly reduce power requirements while offering life increases to 100%. The high plate and grid current ratings permit a wide range of operating conditions; terminal inductances are very low; high transconductance characteristics assure stable operation, low grid drive and high plate efficiency.

ML-6426 uses a new bayonet-pin

Machlett water jacket and is rated for 80kw input, 40kw anode dissipation. ML-6427 employs unique aluminum radiator to reduce weight to 20 pounds, as against 230 pounds for nearest corre-

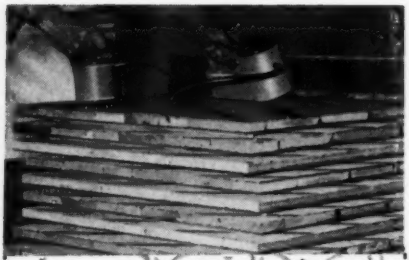
5 BASIC UNITS IN 1 PLURALITY

OILSTONE GRINDERS

With one Mummert-Dixon Plurality Oilstone Grinder you get (1) Coarse Oilstone Wheel, (2) Fine Oilstone Wheel, (3) Grinding Cone, (4) Leather Stropping Wheel and (5) General Grinding Wheel. Made in 3 sizes to meet every grinding and sharpening requirement in woodworking plants. Designed for hard and long usage. Efficient. Easily accessible. Investigate Mummert-Dixon equipment now. Send for informative literature today. No obligation.

MUMMERT-DIXON CO.

124 Philadelphia St., Hanover, Pennsylvania



Is wet lumber...

	Yes	No
Bringing customer complaints?	■	■
Spoiling tools & finished products?	■	■
Adding to freight, labor and production costs?	■	■
Downgrading your stock?	■	■

ANY YESSES? Then moisture is costing you money. It will pay you to find out how Moisture Register *3-second* moisture tests have helped solve these problems in . . .

Lumber Mills & Dealers
Sash & Door • Cabinet Shops
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FAST • ACCURATE • PORTABLE
ANYONE CAN OPERATE
DEPENDABLE RUGGED
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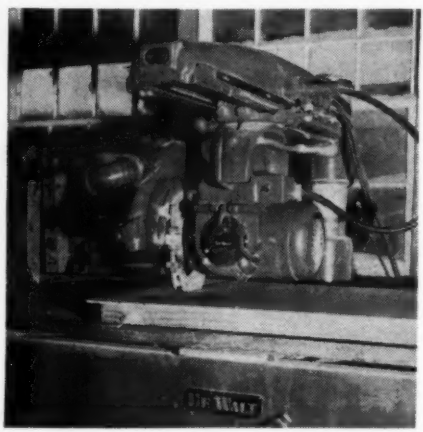
Instruments
MOISTURE REGISTER CO., Dept. WD
P.O. Box S10, Alhambra, California

sponding type; ML-6427 is rated for 70 kw input, 20 kw anode dissipation. Full ratings on both tubes to 30mc; reduced ratings to 90mc.

HOLD-DOWN FOR SAWS

This hold-down device has been designed and developed to make dadoing and grooving operations more accurate, productive and efficient. The tool is attached in a rigid position on the machine hub between the motor and the saw shoulder, by a split yoke which is one and two of three parts. The third part bears on the material being worked and is attached to the yoke by studs with locking nuts to insure a fixed position.

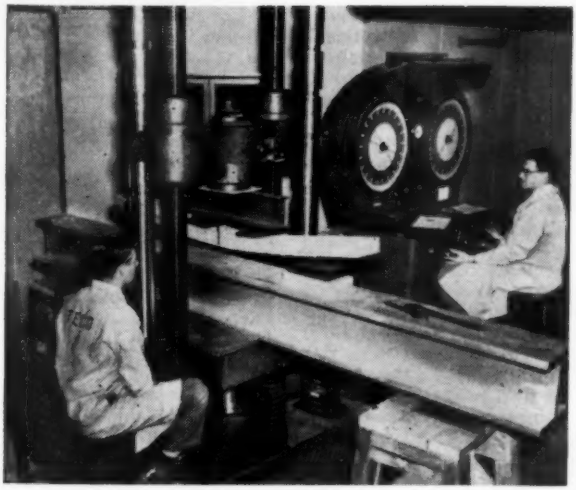
The saw is set in position for the desired cutting depth. Then part three is lowered so as to bear on the material to be worked. Part three has a vertical range that gives sufficient space for any normal conditions, and does



not interfere with the operation of the machine for other uses.

Designer of this woodworking aid is B. Earle Thompson, 4416 Garden Ave., West Palm Beach, Fla. He would like to contact anyone interested in manufacturing these units. At present attachments are only available in limited quantities.

TESTS LAMINATED LUMBER



Stronger and more wear resistant flooring and load-bearing walls for industrial plants, warehouses, railroad cars, highway truck beds, river barges, wharves, residential houses and other heavy duty services have resulted from extensive tests of edge-grain laminated lumber reinforced with steel dowels.

Model 111 Base Mounting

Speed Production with . . .

NEW • IMPROVED IN-LINE AUTOMATIC

DRILL UNIT

For pilot and shank holes, for screws, dowel and wire holes, etc.

BY ELECTRO-MECHANO CO.

In 1947, E-M introduced its first semi-automatic production drill unit. Thousands have successfully been used to solve simple and complex drilling jobs, etc. Now E-M proudly presents a New Line of compact self-contained air feed variable spindle speed drill heads featuring: IN-LINE design of pneumatic feed hydraulic control, electric motor and spindle. All side pull on spindle has been eliminated. Air and oil are separate; oil sealed in closed circuit. Push-Button or automatic electric control—rapid advance to work—Adjustable feed thru work—Automatic return and cycling.

CAPACITY ¼"—STROKE 1½"
R.P.M. 1000—10,000 2500—15,000

PRICES—Ready to Drill:
COLUMN MOUNT $295.00, PAD MOUNT $315.00
VALVE-RELAY $42.50

Write for Literature and Name of Nearest Dealer

The ELECTRO - MECHANO Co.
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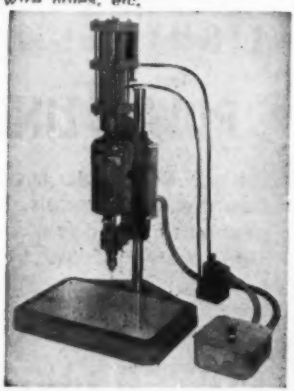


Model 110 with Valve and Relay

Recent bending tests of long beams 12" wide showed best dowel spacing, minimum length of component wooden strips, allowable number and arrangement of end joints, and resulted in a revised comprehensive manufacturing specification for Doweloc, a product of Edge Grain Timber Products, Inc., Columbus, Ohio. Tests were conducted in Washington, D. C., by Timber Engineering Company, research affiliate of the National Lumber Manufacturers Association.

Development was guided by results obtained with the 200,000-lb. capacity Baldwin-Lima-Hamilton testing machine in the Teco laboratory. An earlier test program with "the Baldwin" had shown that properly designed edge-grain laminated lumber has a substantial load-carrying advantage over common grades of green lumber which are commonly used for these purposes. Many combinations of different grades of different hardwoods with combinations of different dimensions were tested.

Structural edge-grain laminated lumber is an assembly of tongued and grooved wooden strips in which the grain is so oriented as to produce a quarter-grained wearing surface and the component strips are held together by steel spiral drive dowels. In Doweloc the dowels are ⅜" in diameter and spaced 12" apart starting within 2" to 3" from the ends of each finished piece.

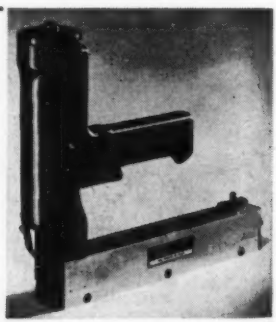
CARBIDE ROUTER BITS

Development of a new manufacturing process that has substantially reduced shank breakage on copper-colored O.C.E. router bits, has been disclosed by Price & Rutzebeck.

Key to the new production process is said to be the sequence of first braising in the carbide cutting edge inserts, then heat treating the bit. Stress equalization that makes shanks far more resistant to breaks is achieved by the unusual sequence, according to Parco officials, who also report a special new steel was developed to make it possible.

Announcing

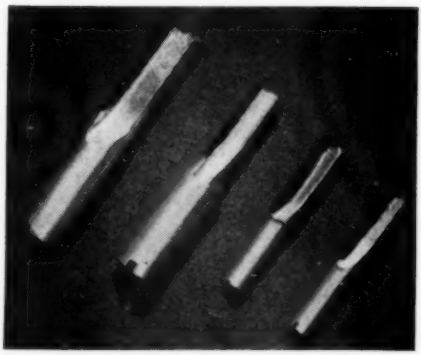
THE NEW LIGHTWEIGHT L-3 POWER-LINE STAPLER



The new L-3 Stapler is actually 3 pounds lighter than previous models, with simpler operating mechanism. Ideal for cabinet making, assembling drawers, case backs on furniture, sash and door work, etc. *Write for literature.*

Branch plant: High Point, North Carolina Warehouse: Detroit, Mich.
Sales representatives: Chicago, Memphis, New York, San Francisco, St. Louis, Boston

POWERS WIRE PRODUCTS COMPANY
540 South Monterey Pass Road Monterey Park, California



All ¼" shank O.C.E. bits and also two of the ½" shank diameter group now are being made by the new process, manufacturer states. Illustrated literature is available from Price & Rutzebeck, tool distributing specialists at 22150 Meekland Ave., Hayward, Calif.

ELECTRONIC WELDER FOR WOOD

WorkRite Products Co., manufacturers of electrical products for the past 47 years, have added a new model to their line of electronic welders for wood and plastics. It is a heavy duty, yet portable model which can be carried about the shop, or taken out on the job and moved around as needed.

The complete unit consists of the electronic generator, a new style, lightweight hand gun, and connecting coaxial cable of 13 ft. The newly designed hand gun is aluminum with non-breakable silicone legs. The tuning control is operated by the thumb, leaving the other hand free for holding down the work. A neon glow lamp in the hand gun indicates when maximum heat is obtained. A meter on the panel of the generator gives the same information in milliamperes.

Veneering, paneling, self-edging, and banding are almost instantaneous operations. These machines also weld wet or dry woods, Formica, Masonite, Micarta and all non-metallic materials which are normally glued. They are also being used for laying hardwood

FINEST SO-HARD SCREWS SINCE 1867

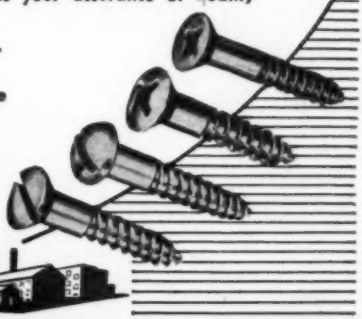
WOOD SCREWS
Packed with Quality from
TOP TO BOTTOM

From a choice variety of head styles to clean sharp threads for longer holding . . . from factory-insured uniformity to a wide, versatile size range* — every So-HARD Wood Screw is your assurance of quality and dependability.

* Range from 3/16" x #0 to 6" x #30 Diam.

Available in:
Steel • Brass • Silicon Bronze
Aluminum • Stainless Steel

FREE! Handy, distinctive 3-color heavy board wall chart showing comparative sizes of wood screws and stove bolts. Write Dept. G for one today.



THE SOUTHINGTON HDWE. MANUFACTURING COMPANY
Southington, Connecticut • U. S. A.

EXPORT OFFICE: Joseph A. Gross Company, 25 Beaver St., New York 4, N.Y.

and parquet floors. furniture and fixture manufacture, bonding wall covering, plywood panels, etc.

For further information and a large illustrated brochure, write to Work-Rite Products Company, 808 W. Doran Street, Glendale 3, California.

ONSRUD FEATURES NEW LINE

A new line of carbide tipped true spiral shaping cutters has been announced by Onsrud Cutter Manufacturing Company, Libertyville, Ill. Six standard sizes are listed in the manufacturer's bulletin, with specially engineered cutters available in other sizes to meet the requirements of individual applications.

Onsrud carbide tipped true spiral shaping cutters are made from precision machined high grade carbon steel and formed Helical carbide of a proven grade; also, they are statically and dynamically balanced. The Helical carbide blade is formed in manufacturing, not by hot twisting, so blades are of standard metallurgical quality.

The 20° helix angle and the 15° positive rake angle, which is in the cutter pictured has proven to be more or less standard in the majority of average machining operations. However, the cutter can be made to whatever helix and rake angle the customer

Sensational NEW Dovetail BIT!

• TOUGHER
Cuts hardest materials easily

• CLEANER CUTS
Cuts smoother and more evenly

• LONGER LIFE
15 to 20 times longer productive life

Makers of Dodds Dovetailers

ALEXANDER DODDS COMPANY
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Carter
BAND-SAW MACHINE ACCESSORIES
used as standard equipment by leading band-saw manufacturers...

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- MICRO-GUIDES
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423 Wm. Alden Smith Bldg.
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GRAND RAPIDS 2, MICHIGAN

specifies. The true spiral of Onsrud spiral cutters has the same helix, rake and clearance throughout the entire cutter, regardless of length.

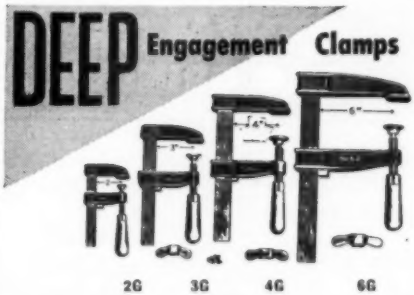
CLAMP DESCRIBED

New literature from Turnus Tools, East Hartford, Conn., describes a new German-made clamp set. These tools are ideal for making frames of all kinds. The set consists of a handy mounting pliers and different sizes of powerful spring steel clamps.

The specially designed spring clamps hold securely without damaging the surface of the work. With the quality-made mounting pliers, clamps may be slipped into position and removed in a matter of seconds. The small size and lightweight features of the clamps permit hanging up the glued frame to dry in any position.

A man trying to sell insurance was called before the state commissioner. "Don't you know you can't sell insurance without a license?" he was asked. "I knew I couldn't sell it," the agent said, "but I didn't know the reason."

Some persons are like wheelbarrows. They stand still unless they are pushed.



Pictured are four of the many available models of Hartford clamps. There is one to meet every work-holding need. Hartford Clamps are standard in thousands of shops. A fact-filled 20-page catalog is yours for the asking. Write for your free copy today.

WRITE FOR CATALOG

HARTFORD Since 1915
CLAMP CO.
EAST HARTFORD, CONN.

dependable HARDWOOD DIMENSION

- finished, semi-finished or rough
- lumber or parts
- solid or laminated
- corestocks, blocks
- wood-and-plastics
- Gam-en-wood

GAMBLE BROTHERS GB GUARANTEED BOND
INCORPORATED

Engineered Wood Parts in Southern and Appalachian Hardwoods, Walnut, or Mahogany.

OFFICES AND PLANT: Louisville 9, Kentucky

MACHINES FOR PATTERN SHOPS

The complete line of woodworking machinery for pattern shops is shown in an attractive bulletin by the Oliver Machinery Co., Grand Rapids, Mich. The eight-page folder describes disc and spindle sanders; circular and band saws; pattern lathes; surfacers; jointers; type embossing presses; rout or borers; pattern milling machines and tool grinders. Each machine is described and illustrated.

REES DUST ARRESTOR

A four-page folder from the Rees Blow Pipe Co., 2929 Fifth St., Berkeley 10, Calif., describes the company's cloth tube dust arrestors. The bulletin describes operation of the equipment; illustrates several applications; and lists and explains the various construction features. Last page of the bulletin shows standard sizes and dimensions by means of tables.

STARRETT CATALOG

The L. S. Starrett Co., Athol, Mass., has issued a comprehensive catalog describing their dial indicators, dial gages and instruments. The catalog is very well illustrated, including drawings showing applications as well as physical dimensions of the products. In addition, the booklet is punched in such a way as to be easily inserted in a loose leaf book and kept for ready reference.

GOODSPEED CATALOG

The Goodspeed Machine Company, Winchendon, Mass., has done a fine job of showing its line of machines in a booklet called "One Hundred Years of Progress." The 12-page folder illustrates the machines, describes the work accomplished and suggests that for further information, the reader request a specific bulletin by number.

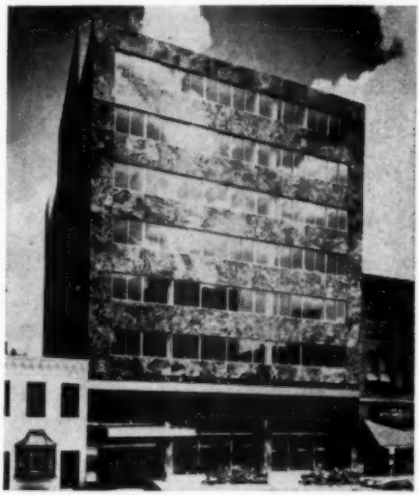
Goodspeed Machine Company is one of the earliest woodworking machinery manufacturers in the country. The line of machinery currently includes: planers, surfacers, shapers, lathes, back knife lathes, boring machines, dowel machines, jointers and box board equipment.

"Some men have hundreds of reasons why they cannot do what they want to, when all they need is just one reason why they can."

—Whitney

NATIONAL HOUSING CENTER DEDICATED

The National Housing Center—home of the American home building industry—was dedicated October 3 by Vice-President Richard M. Nixon at colorful ceremonies. The Center, at 1625 L Street, N. W., Washington, D. C., houses five floors of exhibits representing a cross-section of home building material, supplies and equipment. The Center is dedicated to a better understanding of home building on the part of the home builder and the home buyer and offers services such as a completely equipped library, modern press room, auditorium and new product section.



The two top floors of the building house offices of the National Association of Home Builders.

If you can keep your head when all about you are losing theirs—perhaps you just don't understand the situation.

There is no wisdom that can take the place of humanity.

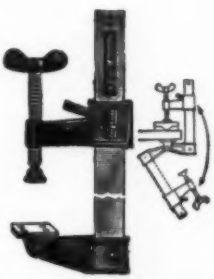
insist on famous

" TRADE MARK Jorgensen " REG U S PAT OFF

AND " Pony " REG. U. S. PAT. OFF.

CLAMPS

ASK YOUR SUPPLIER



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ADJUSTABLE CLAMP CO.

"The Clamp Folks"

418 N. Ashland Ave. • Chicago 22, Ill.

PRODUCTS INDEX

Compiled for quick reference and for your convenience, this handy index of products shows the pages on which you will find the items advertised in this issue. When writing to advertisers, it will be appreciated if you will mention WOOD WORKING DIGEST.

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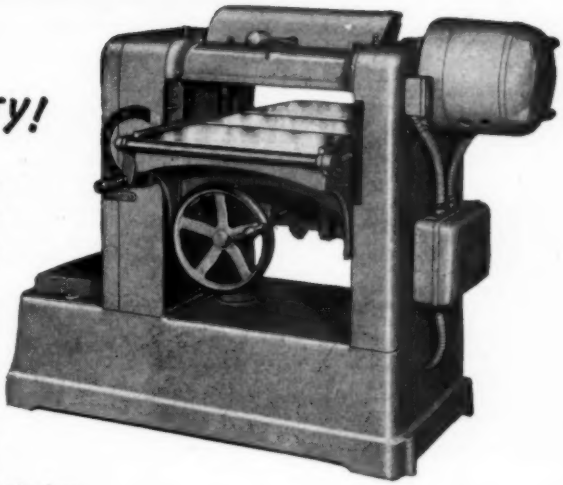
NORTHFIELD
No. 2 SINGLE SURFACER



HERE'S A LITTLE BEAUTY!

ALTHOUGH the smallest surfacer in the line, it's still a heavy, well built, smooth running machine, with all the traditional Northfield performance and dependability. It features a greatly simplified and trouble free mechanical design.

It will take material 18" wide and from 1/8 to 8" thick, at variable speeds of from 26' to 60' per minute. Highly recommended for manual training shops, sash and door, and furniture plants.

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HIGH SPEED, PRECISION

- Band Saws
- Surfacers
- Wood Shapers
- Jointers
- Saw Tables
- Mortisers (Chain & Hollow Chisel)
- Universal Woodworkers

The NORTHFIELD Guarantee

We guarantee perfect satisfaction to anyone who may purchase our machines, and if any reasonable exceptions are taken to their good performance, they may be returned at our expense.

Northfield **FOUNDRY & MACHINE CO.**

★ ★ ★ **NORTHFIELD, MINNESOTA, U.S.A.**

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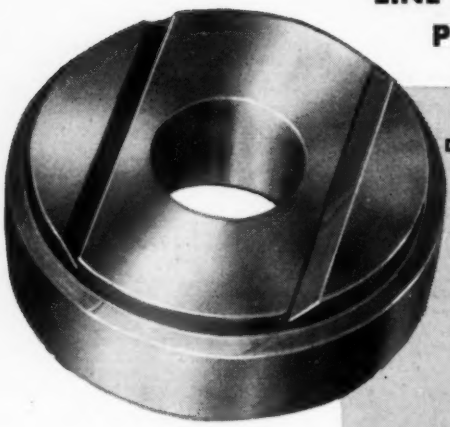
LINE OF BALL BEARING AND PLAIN SHAPER COLLARS!



STOCK SIZES AVAILABLE

DIAMETER	BORE
1½"	½"
1¾"	½"—⅝"
2"	½"—⅝"—¾"
2¼"	⅝"—¾"—⅞"—1"
2½"	¾"—⅞"—1"—1⅛"
2¾"	1"—1⅛"—1¼"
3"	1"—1⅛"—1¼"—1⅜"
3¼"	1"—1⅛"—1¼"—1⅜"
3½"	1"—1⅛"—1¼"—1⅜"
3¾"	1"—1⅛"—1¼"—1⅜"
4"	1"—1⅛"—1¼"—1⅜"

GUSTAFSON AND SCOTT SELLS CUTTER DIVISION TO WISCONSIN KNIFE

Founded in 1887, the Gustafson and Scott Mfg. Co. of Chicago has long been an important factor in the manufacture of knives, cutterheads, shaper collars, glue joint and solid wing type cutters and special woodworking tools. Patents had been issued on their design of a safety type round cutterhead. All G&S inventories, tools, jigs, fixtures, drawings and records have been transferred to the modern plant of the new owner where service to G&S customers will be continued without delay.

Shaper Collars are available in either Solid or Ball Bearing Types. The outer rim of the Ball Bearing Shaper Collars is independent of the slotted body portion so that it follows along with the feed of the work. The ball bearing type eliminates friction between the collar and the pattern of the work — no more burning! The sizes listed are in stock or in process for prompt shipment. The same sizes are available in Solid Grooved Shaper Collars accurately machined of alloy steel and perfectly balanced.

Engineers to the Woodworking Industry!

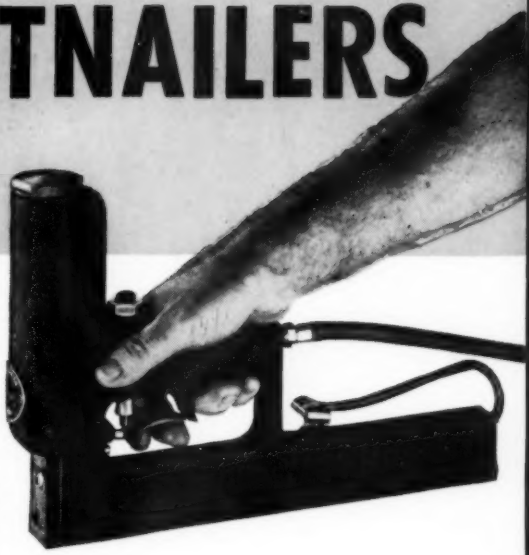
WISCONSIN KNIFE WORKS
BELOIT, WISCONSIN

Air Drive

High Velocity Non-Recoil

SPOTNAILERS

FIRE LONG FASTENERS INTO HARDEST WOODS with 100 P.S.I. or less



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Most millwork and furniture fastening jobs can be done more profitably with Spotnailers. See your local Spotnail Man. His experience can help you.

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1⅛" Long

SPOTNAILS, INC.

202

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STRAIGHT LINE RIPPER

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Smaller size saw blades can be used:
14" saw cuts 4" lumber
9" saw cuts 1" lumber

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